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August 1988

PLAY METER

VOLUME 14, NO. 6

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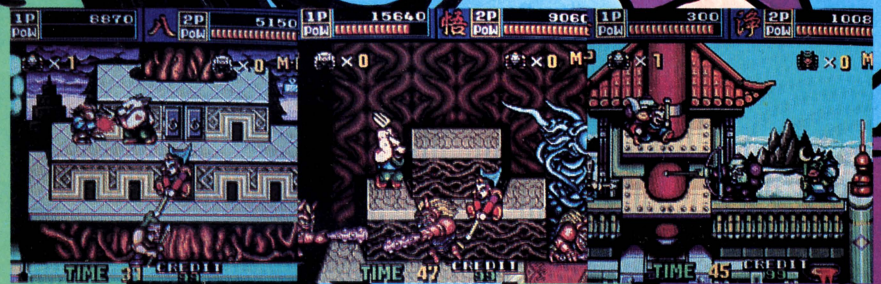

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NEWS BULLETIN

.....Mr. Nakamura, president of Namco Limited in Japan, resigned from Atari Games Corp.'s board of directors during Atari's annual shareholders meeting in June. He had been chairman of the board for the last three years. Another board member, Mr. Kawakami of Namco, resigned along with Nakamura. The resignations stem primarily from Namco's acquisition of a major interest in a competitor and the resultant conflict of interest. The remaining board of directors is composed of representatives from Warner Communications, Inc., a major shareholder of Atari Games. The resignations do not, however, signal a change in the management of Atari Games. But Namco Limited and Nakamura will no longer have direct involvement in the day-to-day operations at Atari Games. Namco remains a major shareholder of Atari Games Corp., and the business relationship between the two companies is unchanged as well.

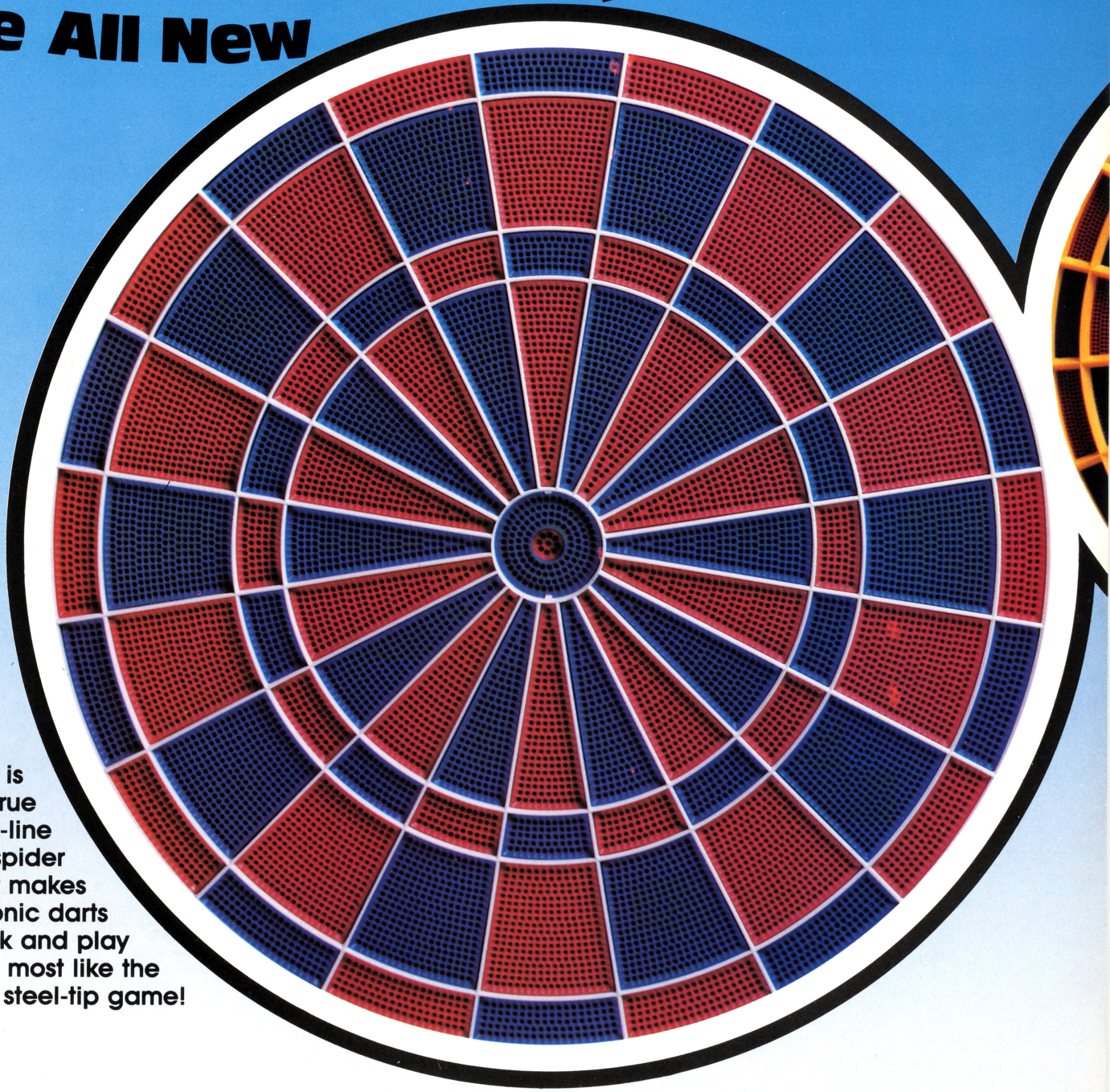
.....Chicago's Bally Manufacturing Co. has sold its pinball and video game manufacturing business to WMS Industries, whose subsidiary, Williams Electronics, is Bally's main pinball competitor. The deal had not been officially completed at press time, but reports are that WMS will buy Bally's coin-op assets for about $8 million. There will be three separate divisions: WMS, Williams, and Bally Midway. Marty Glazman, Williams' vice president of sales and marketing, said the distribution network will not change. "Williams distributors won't become Bally distributors, and vice versa," he said. The deal will include Linc-Smith, Bally's cabinet/silk screening division, Glazman said. "Quite a few Bally Midway employees have been offered jobs at Williams Electronics," Glazman added. One such employee is Joe Dillon, who is expected to return to Williams as the vice president of marketing.

.....Smart Industries' *Clean Sweep* single, double and triple cranes have been approved as legal by the gaming commissions in Maine and Washington State, two states where they have been illegal. "They did tests and studies of our games and found them to be more games of skill than games of chance," said Jeff Smart. "Also, the commissions found that the joystick and the program operating the claw allowed movement in all directions, giving the player full control." *Clean Sweep* is distributed in Maine by Rowe International of Dedham, Mass. and by Music-Vend Distributing Co. of Spokane, Wash. in Washington State.

.....Sixteen people were booked recently in Jefferson Parish, Louisiana on gambling charges, following a month-long investigation by the sheriff office's vice squad into electronic poker machine payoffs. Undercover officers were paid 25 cents per game after accumulating more than 40 replays on the machines. After reaching the limit, replays were eliminated from the machines with a switch or a magnetic device. The new administration under Gov. Buddy Roemer has pledged to continue these crackdowns on illegal payoffs.

The Fat 'Spider'

The All New T-60/30 Target



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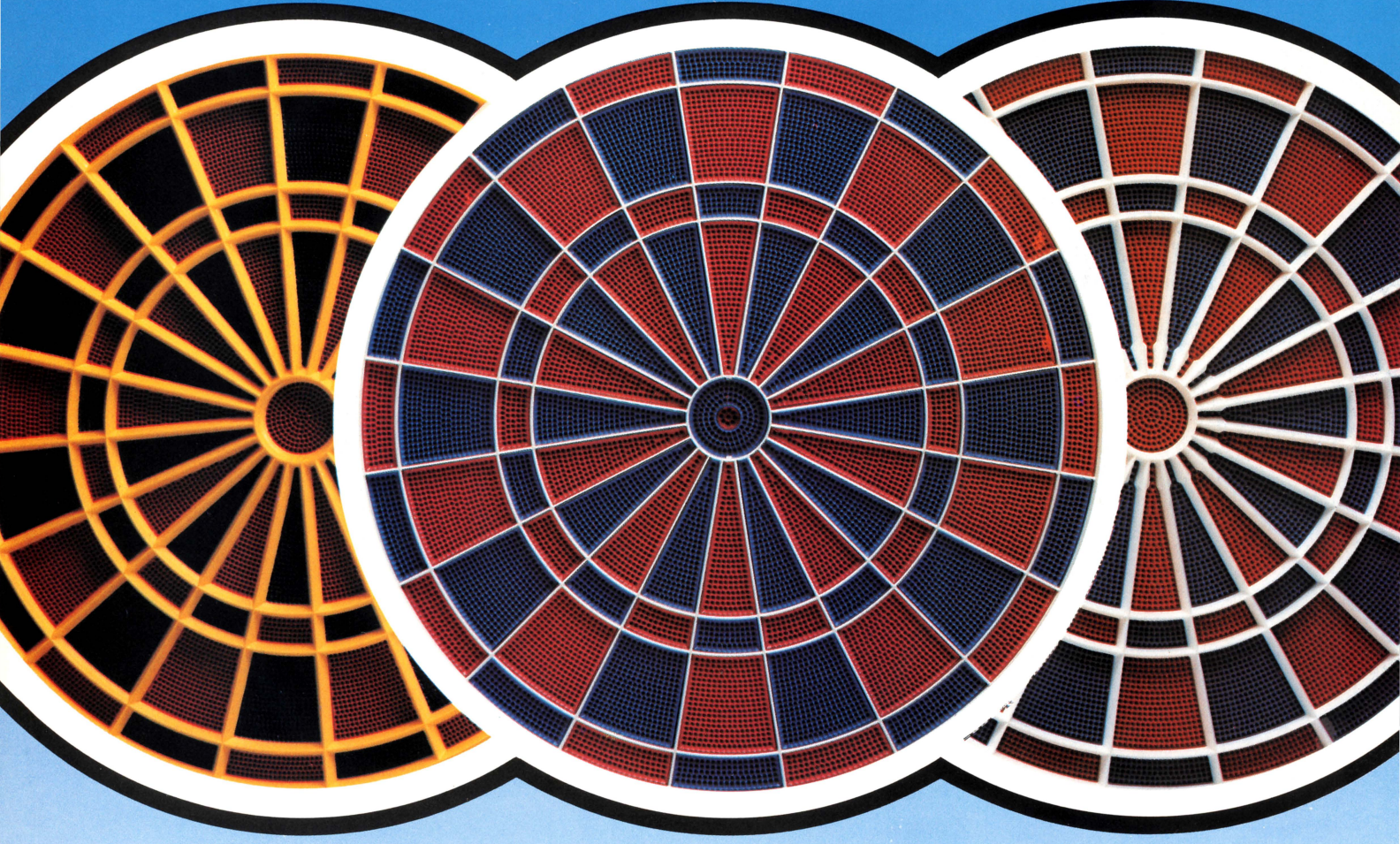

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PLAY METER

MONTHLY PUBLICATION OF THE COIN-OPERATED ENTERTAINMENT INDUSTRY

VOL. 14, NO. 7 | CONTENTS | AUGUST, 1988

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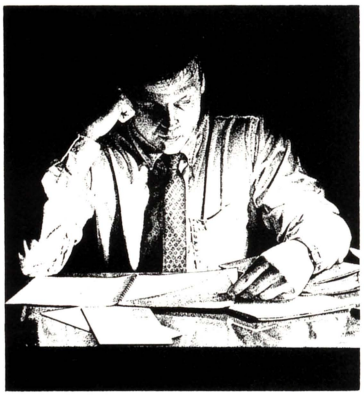


Buying An Amusement Business

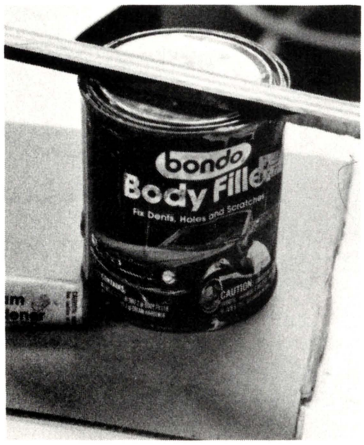
30

In our March, 1988, issue, in an article titled "What is Your Business Really Worth?", Charles Ross advised operators on how to fairly place a value on their businesses when trying to sell. In this issue he wears another hat as he gives operators some finer points to consider when they are buying a route.

Speak Softly and Carry A Big Business Card

48

Maybe you have business cards and maybe you don't. Maybe you've never even thought much about business cards. However, you'll start giving them some serious thought after reading this article by Bonnie Theard. She emphasizes that business cards are important to your business, and more importantly, to your customers. Make a favorable and lasting impression with something as simple as a memorable business card.



Technical Topics

57

Operators consistently ask us to beef up our technical section so we asked our technical expert, Randy Fromm, to write an article on the most common technical problem operators face. He told us that it had already been done several years ago in two articles that were still timely. Instead of having Randy do them over, we have reprinted those articles beginning with "Replacing Picture Tubes" followed by "Inexpensive and Easy To Use, The Digital Multimeter." But we didn't let him completely off the hook; on page 56, you can read Randy's advice for using bondo.

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Cover: Nintendo has made a significant move into the home video business but that doesn't mean that the company isn't serious about its coin-op business. Pictured on our cover are Nintendo's management team: (in front) Minoru Arakawa, president; (back from left) Linda Weber, director of administration; Howard Lincoln, senior vice president; Darlene Kindler, manager international; and Al Stone, vice president of sales and marketing.

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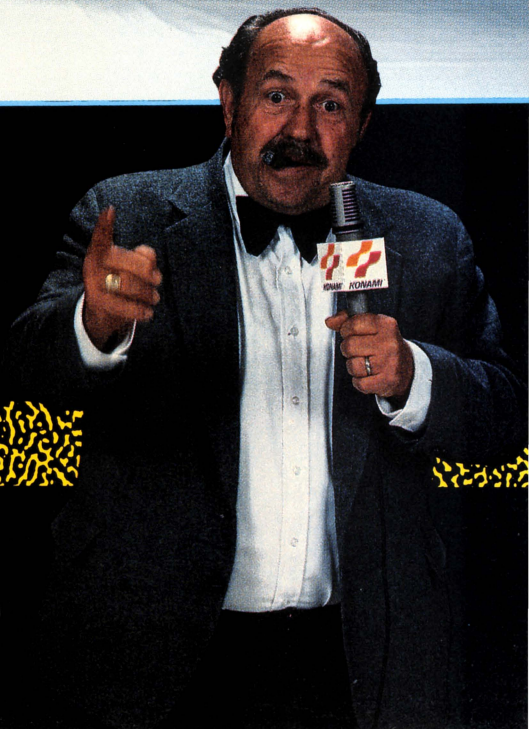

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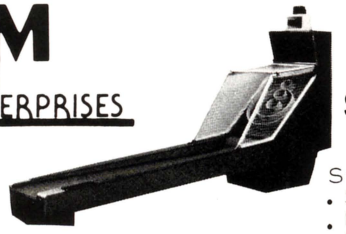

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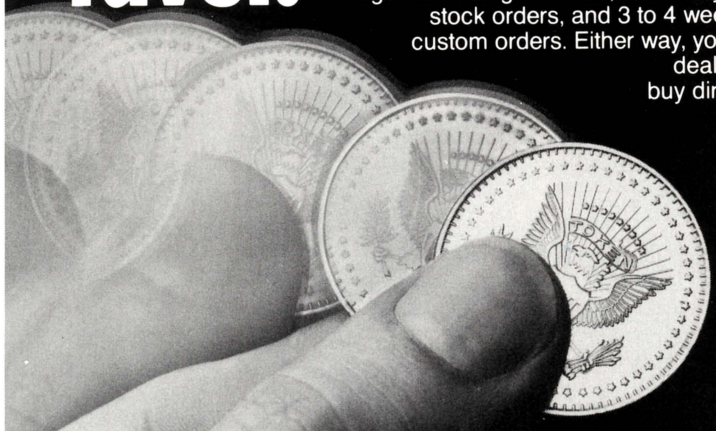

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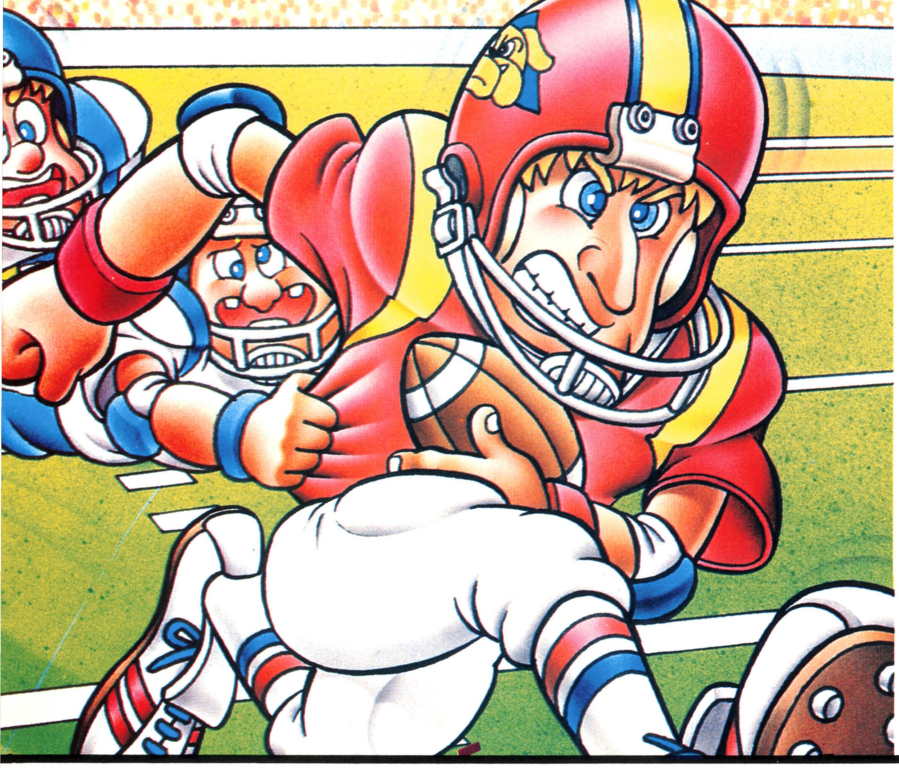

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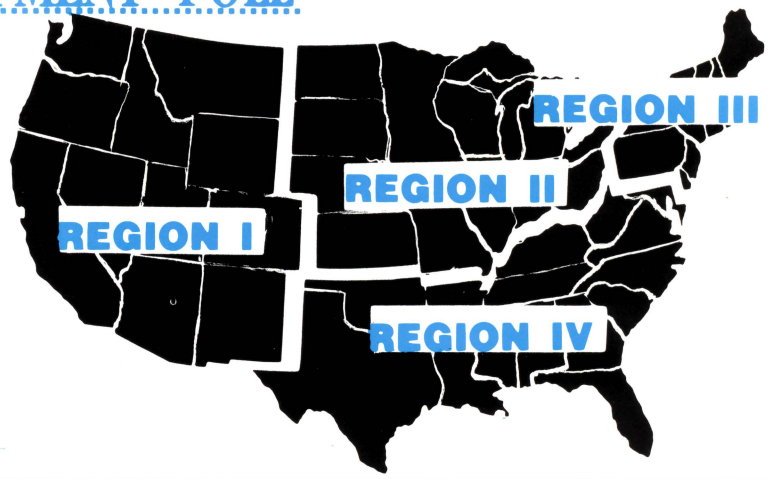
EQUIPMENT POLL

Operators from four regions of the country will be sending us their lists of top games each month. These, of course, are their top-earning games and do not necessarily reflect return on investment. We urge all operators to weigh the value of each game on return on investment, not just revenues.



WEST 1

REGION I

After Burner	Galaga '88	Operation Wolf	Super Sprint	Tiger Road
Ajax	Guerrilla War	Rolling Thunder	Thundercade	Vigilante
Bad Dudes	Heavy Barrel	Shinobi	Twin Eagle	
Double Dragon	Kageki	Silkworm	Twin Cobra	

WEST 2

Ajax	Karnov	Super Contra
Bad Dudes	Road Blasters	ThunderBlade
Double Dragon	Shinobi	Twin Eagle
Heavy Barrel	Street Fighter	Vindicator

CENTRAL 1

REGION II

Chopper I	Heavy Barrel	Quarterback	(new high earners:
Cyclone	Heavyweight Champ	Shinobi	Main Event, Hot
Dead Angle	Operation Wolf	Shoot to Win	Rod
Double Dragon		Super Sprint	

CENTRAL 2

After Burner	Double Dragon	Main Event	Toobin'
Bad Dudes	Double Play	Ninja Warrior	Vindicator
Banzai Run	Guerrilla War	Operation Wolf	
Big Choice	Heavy Barrel	RBI	
Cyclone	Hot Rod	Silkworm	

EAST 1

REGION III

Quarterback	Toobin' (new)	RBI (still going)	ThunderBlade
Operation Wolf	Street Fighter	Cyclone	Hot Rod
Main Event (strong)	Bad Dudes	Banzai Run (good novelty)	Out Run
	Double Dragon (slowing)		

SOUTH 1

REGION IV

Bad Dudes	Double Dragon	Many Hoops Basketball	R-Type (good ROI)	Silk Worm
Blasteroids	Guerrilla War	Operation Wolf	Shinobi	Twin Eagle
Dead Angle	Heavy Barrel			Vigilante

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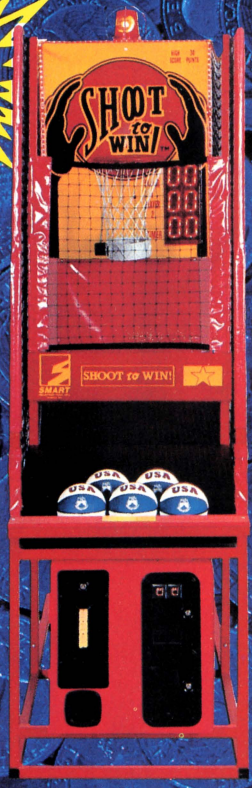

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LETTERS

Murphy appreciated

We laughed and laughed at Murphy's Law Revisited (Play Meter, June '88). Being involved in a tourist video arcade at the beach, we agree that "deposit 25 cents" is too complicated. It's completely incomprehensible. We use tokens.

Thanks for the laugh. We needed it.

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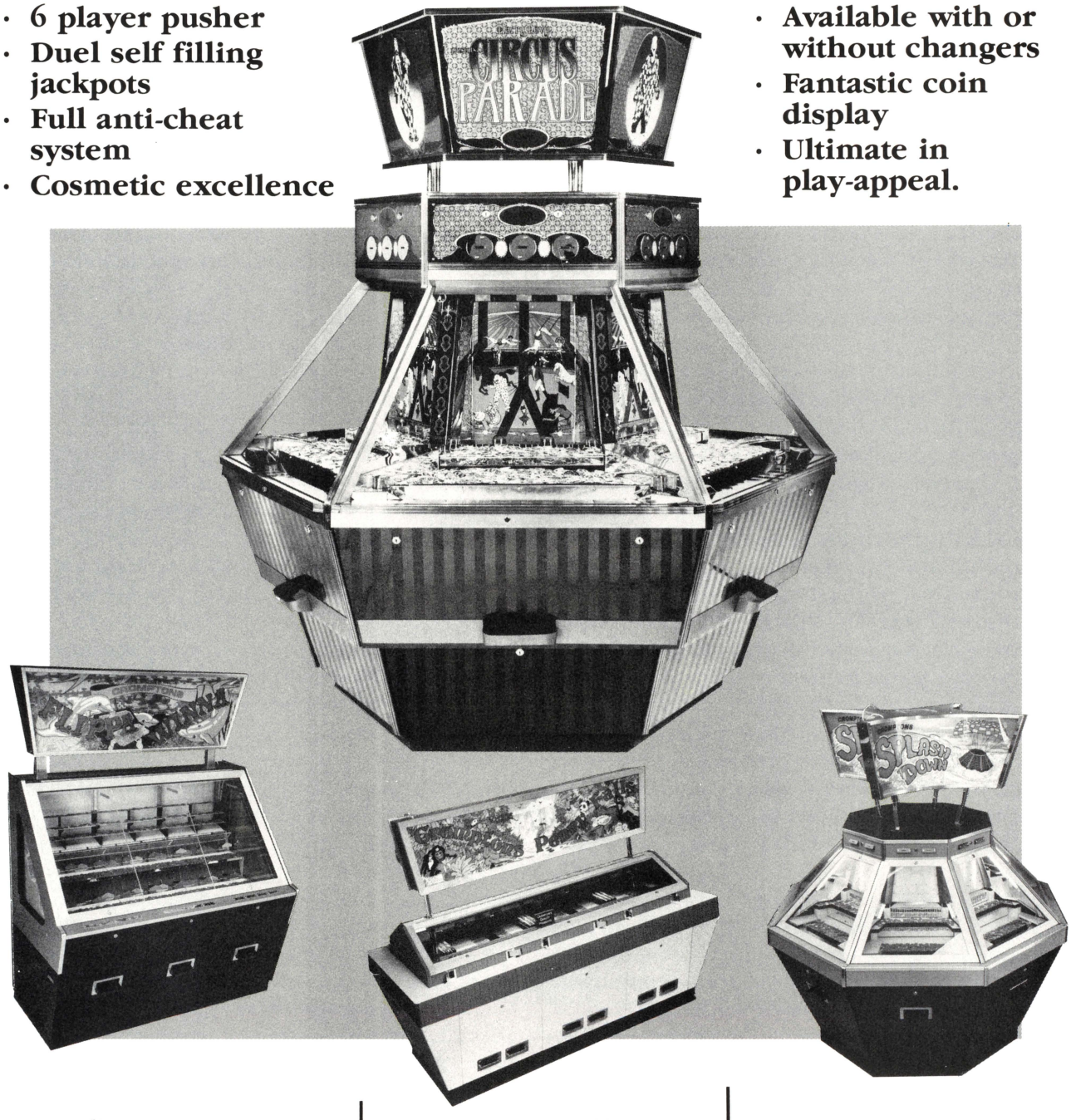

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Don't Stop Now

Last month you read about the Washington Conference held in our nation's capital. The goal of the many operators, manufacturers, distributors attending was soliciting legislative support for various industry programs or issues and representing the industry. It was an impressive turnout and everyone, in fact, did make headway in discussing our industry, what it is all about, and problems that could be solved from the legislative end.

We all left with a wonderful sense of pride and accomplishment, knowing the right ears were listening. But, now comes the hardest part—following up on the contacts and reiterating positions.

I had a very informative conversation with the American Amusement Machine Association's new executive vice president, Bob Fay, and found out that he has been beating a path to the capital initiating further meetings with congressmen and senators. He explained that many of the political figures the industry met at the Conference weren't making concrete decisions about issues and left time for further investigation. I'm sure that as busy as those guys are, they are not going to make commitments if there is no follow-through.

If you had a meeting or talked with your representatives, take a few moments to write a letter or, better yet, arrange another meeting if you get the chance. I'm sure they know how serious industry people are simply by the attendance at the Conference but it certainly can't hurt to restate it as many times as necessary. We're all too well aware that our theme song could be by Bruce Springsteen when he sings One Step Up and Two Steps Back. It seems we are continually fighting for any respectability and favorable attention which is always too scarce.

Speaking of Bob Fay . . . Wait! don't stop reading now! I know he's like Vivian Leigh who was so well-known for her role as Scarlett O'Hara in the movie Gone With The Wind that it was hard to accept her in any other role. But she played some other popular characters, and played them well. Of course, Bob was the enforcement figure at the association for so long it is a little difficult, even for me, to realize he has taken another role, one he may be better suited for. We chatted for quite a while and I have to admit I was impressed with his ideas and perception of the industry. By the way, we did not even touch on the subject of parallel boards when we got together after Dick Hawkins' 25th anniversary party to which Bob and I were both invited!

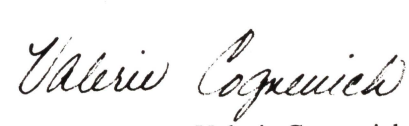
Wait! Did you say that Bob Fay was at *Dick Hawkins'* party? Yes, you heard right. This may just be an example of how eager Bob really is to see the industry advance through promotions and public relations and he has some ideas in that direction. Unfortunately, he can't shake the FBI image. I can't say I agreed with everything Bob did or said as far as parallel boards and we may never agree on it, but I think I can say that we do agree that the industry needs to work together.

Bob believes that the industry's two associations must work together. As he says, "This industry is too small to have two associations at odds with each other." And he's right about that. I'm not naive about the parallel issue being resolved to both side's liking; it's causing operators and manufacturers to choose sides. Laws are subject to *interpretation*, and like the Bible, you can interpret some things any way you want. The Copiat Case was a perfect example: Five judges arrived at one decision but two of them said Customs was right, whereas the others didn't say Customs was right but agreed that it wasn't really doing anything wrong.

Aside from that, though, most problems come from outside the industry—the parents who feel games are only a step above sin, the legislators who want more money, etc. It's not easy to reach the masses when you are talking about a small industry: Who would head up the campaign and where would the money come from? It's amazing how quickly Nintendo has become a household word because of the publicity surrounding its home games. But big bucks paid for mass promotion making Nintendo synonymous with home video. Kids don't ask friends if they have a home video system; they ask if they have a Nintendo.

The two industry associations could pool their resources and embark on some serious efforts to reach the players, to promote the industry. In checking the thesaurus you'll see that words like elevate, advance, upgrade, boost, plug, push, build up, and even ballyhoo can be used interchangeably with promote. It is absolutely inconceivable that a whole industry couldn't promote itself when one company has done it.

If you have been doing many worthwhile promotions, please accept my applause because I am not taking your efforts lightly. In fact, it is efforts by the few that make us even more aware that more could and should be done by the industry as a whole.



Valerie Cognevich
Editor

DREW

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Full House
WINS
10 Skill Points

Flush
WINS
8 Skill Points

BONUS WINS
2's at 100
3's at 200

Straight
WINS
5 Skill Points

3 of a Kind
WINS
3 Skill Points

2 Pairs
WINS
2 Skill Points

Pair of Aces
WINS
1 Skill Point

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Per
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Pinballs suffer from *lack* of typecasting

In Hollywood, typecasting is a curse. Actors have rebelled against being typecast even though an effective portrayal of a certain type of character has made them famous. A compelling performance can backfire and forever lock the actor into a type of role that he has difficulty separating himself from. This happened to Christopher Reeve, who has had trouble shedding his Superman image and has not enjoyed as much success or audience acceptance in other movie roles. Another outstanding example is Sean Connery, forever etched in our minds as *the* James Bond.

In the world of coin-op, typecasting is essential, at least for videos. Operators look over the new crop of equipment and figure they need a ''driving'' game for one type of location, ''a shooting game'' for another spot, or a ''shoot 'em up'' at another. Games immediately fall into categories and are easily pigeon-holed, facilitating placement in street locations and arcades depending on needs. Pinball games have never been typecast as ''skill shot'' games, ''multiball'' games, ''long shot games'' or ''drop target'' games, for example. Operators usually think in terms of ''a new pinball'' and that's it.

There are fewer pinball manufacturers than video manufacturers, and fewer pinball games on the street. But pinball games cannot all be lumped together as one generic category—a pinball—nothing more and nothing less, with no particular characteristics that make one more suitable for one location than another. Perhaps it's time to take a closer look at those pinballs we've been taking for granted as just a pinball. For a piece of equipment that's been around over 50 years and served us well, it deserves better.

There are advantages to pinball games that may have been overlooked in the past. For one, it's a game that appeals to women more than videos. It also allows more time per play, usually, than videos, especially the newest releases that require a learning period before being really expert on the game.

Pinballs do have themes—motorcycle racing, space interplay, spy-thriller, car chase, and roller coaster thrill rides, for starters. Let's give our old friend, the flipper game, a little more definition. Think ahead about locations when considering a new flipper. What do you already have on hand? Wouldn't a new motocross racing pinball fit in fine with the ''themes'' you presently have in your lineup?

Let's take pinball out of the faceless category and bring it up front in the limelight. The flashing lights, multi flippers, challenging ramp shots, and multi ball play of the 80's make for good entertainment and that's what this business is all about—entertaining the audience with something new and different. It's not just a pinball, it's a staple of our industry and a piece of amusement history. Old pinballs enjoy life far longer than their video cousins. Let's give pinball its due and start typecasting the games in a manner that befits the game.

I'm just about ready for some of that good flipper magic, watching that silver ball zig-zag all over the playfield, and see those lightboxes come alive. So, I'll just take myself over to the Fun Arcade to see the latest and play an old friend with a new theme.

Bonnie Theard

Bonnie Theard
Managing Editor

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GUEST COMMENTARY

Dream On . . . In the World of Video Game Excitement

by Louis Boasberg

A video game gives to its players "the stuff that dreams are made of"! Any player, young or old, male or female, can be a home run hitter, great quarterback, champion golfer, macho-type Rambo fighter, martial arts expert, master boxer, or machine gunner. In fact he or she can assume many roles and even fight dragons and other evils to their heart's content.

The coin-operated video game has been an international favorite and made its mark in the entertainment world in just 15 years. It has taken its place alongside movies, theatre, music, love, and detective stories as one of the world's greatest forms of entertainment, fun, and excitement.

The coin-operated video game and its older brother, the flipper game, are the basic ingredients of every game room and arcade that exists today. These two entertainment sources provide pleasurable time for the customers of thousands of stores, fast food outlets, ice cream parlors, taverns, bowling alleys, and hundreds of other places where they represent built-in entertainment and an excellent source of revenue.

Here are a number of good reasons to have a video game or flipper game in your business establishment:

- A video game takes up very little space. Besides being a great customer attraction it is an excellent source of steady revenue.
- A video game or flipper game provides pure escapism and fun without a guilt complex or hangover.
- Either game encourages excitement and competition among friends, sweethearts, dates, and even senior citizens.
- A video or flipper game kept clean, neat, and playable, and changed frequently so that the fickle public will always be satisfied, would be a great asset to your place of business.
- A video game or flipper game allows your patrons to play many roles if only for a short time. They may be soldiers, tank or submarine commanders, fighter or bombardier pilots. Or they may once more encounter the ignomatic, mysterious, whimsical and pixish *Pac-Man*.

A beautiful new video or flipper game has the advantage over other types of entertainment you may or may not provide:

Television: This medium offers no income opportunity. Only a portion of your patrons are satisfied. It does not promote sociabilitydancing, and has commercial interruptions. And it could create disunity among patrons because of program likes and dislikes.

- Sports presentations: These are fine when the hometown team is playing, but offers no income opportunity, low female interest, and everyone leaves when the game is over.
- Back Bar with stereo radio wired music: Again, this has no income opportunity. The music control is limited, commercial interruptions are frequent, and there is no selectivity.

● ● ● ● ● ● ● ● ●

There is no substitute for the enjoyment derived from video games or the flights of imagination triggered by participating in adventures beyond our normal lives. Step up to a video game for new challenges, new fantasies, and new experiences—for the cost of a mere quarter.

"The video game and its older brother, the flipper game, are the basic ingredients of every game room and arcade that exists today."

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Contact your Authorized Nintendo Distributor for more details. Or call Nintendo of America Inc., **(206) 882-2040.**

*All titles are subject to location testing. Game release dates will vary.

Nintendo®

The Systems Company

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Double Dragon: ©1988 Tradewest, Inc. licensed from Tecnos Japan Gauntlet: ® & ©1985 Atari Games Corp. R.B.I. Baseball: TM & ©1987 Atari Games Corp; ©1986, 1987 Namco

Corporate headquarters with 303,000 sq. ft. of office and warehouse space. Construction of a third building will more than double the current size.

Playing for keeps at Nintendo

To borrow Mark Twain's comment on the state of his own health—''The reports of my death are greatly exaggerated.'' The same can be said of Nintendo's Commercial Products Division. While there's been lots of talk, rumor, and speculation in the industry, the fact remains coin-op is alive and well at Nintendo.

''We're playing for keeps'', said Minoru Arakawa, president of Nintendo of America, Inc. ''Nintendo is here to stay in coin-op, home entertainment, and in whatever developments the future might bring.''

Arakawa's enthusiastic prognosis for the company isn't unusual. After all, entertainment is in Nintendo's blood. For over 100 years, Nintendo Ltd. of Japan has played a major role in the entertainment industry. Over the years, the company has witnessed the rise and fall of specific game categories and has responded by supplanting old ideas with innovative new solutions.

That's the corporate wisdom that drives Nintendo today—the power and vision to adapt and stay profitable through market change and product refinement.

One significant change the company has had to respond to in recent times has been the explosive growth of the Nintendo Entertainment System, or NES. While others may view it differently, Nintendo is up front and candid about the success of the home video market and its effect on the coin-op industry.

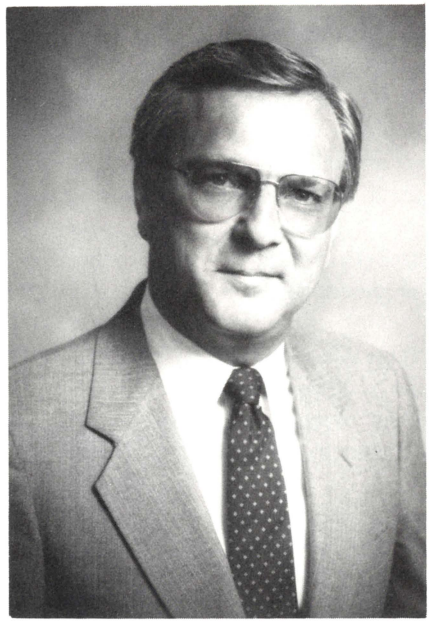
''The popularity of home video game systems like NES doesn't spell disaster for the coin-op business. In fact, we believe quite the opposite,'' said Arakawa.

''The attention electronic video entertainment is receiving as the home market builds will spill over to the arcades. NES is helping create a whole new generation of players for coin-op games. Nintendo's simply out to promote the entire category of electronic video games regardless of whether they're played in an arcade or living room.''

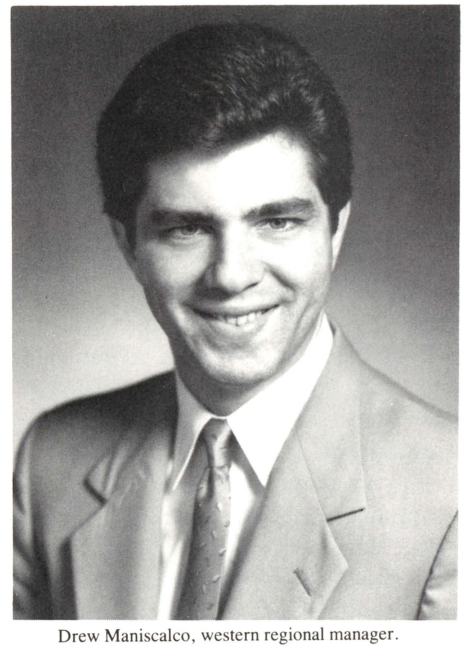
While coin-op and home video can supposedly exist as supportive partners at Nintendo, the question remains: Has all the attention on NES overshadowed Nintendo's coin-op development?

Arakawa thinks not. ''We're very proud of the achievements NES

Chuck Arnold, eastern regional manager.



Mike Minor, midwest regional manager.

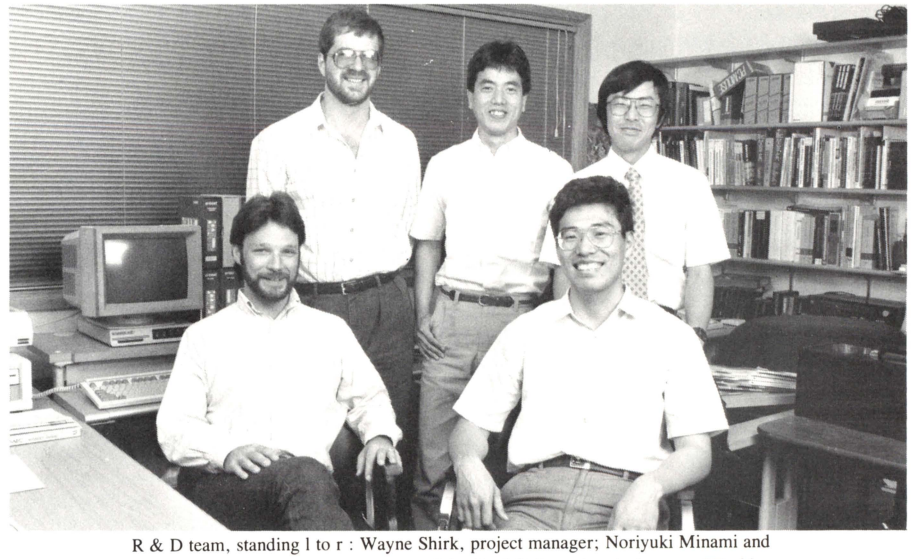


Drew Maniscalco, western regional manager.

Pete Walton, southern regional manager.

Seated l to r: Howard Lincoln, senior vice president; Minoru Arakawa, president; and Alan Stone, vice president of marketing and sales. Standing l to r: Darlene Kindler, manager international; Don James, director of product development; and Linda Weber, director of administration.

Art Gallagher, central regional manager.



R & D team, standing l to r : Wayne Shirk, project manager; Noriyuki Minami and Masahiro Ishizuka, engineers. Seated are John Cordell (l), project designer, and Toshiro Hibino, engineer.

has made in such a short time,'' he said. ''But we also see the big picture. While it (NES) is phenomenally popular right now, we also recognize and remember that we're in business to stay in business. And that means keeping a close eye on the entire plant, not just on one of its branches. Besides, the commercial side of our operation goes back to the very roots of Nintendo of America. It was where we started back in 1980.''

To assure Nintendo's long-term position of strength in the coin-op industry, the company has refocused its development attention on the *PlayChoice-10* System.

To provide the leadership direction and support for this rededication effort, Nintendo has recently appointed one of its founders, Alan Stone, to a new position as vice president of sales and marketing. Stone's responsibilities will cover both domestic and international commercial operations.

''In concentrating our energies on *PlayChoice-10* game development, we're keying on one of our strengths,'' commented Stone. ''For starters, the system's ten games in one cabinet feature makes real sense for operators, especially in single site locations where it can provide the variety and long-term earnings power no other system can match.

''A *PlayChoice-10* periodically updated with the addition of new software will earn a steady stream of collections from its first week on location to its 53rd—without all the hassles and expense of bringing in new hardware,'' stressed Stone.

Enthusiastic acceptance of the system's ''choice'' capabilities has made it a strong favorite in the European market. *PlayChoice-10* activity is particularly high in pubs and bars in the United Kingdom, Italy, France, Spain, and Germany.

Over here, Stone expects that the system's new and challenging software releases in the upcoming months will help drive additional sales and increase market penetration.

''We'll be releasing ten new titles over the next six months,'' said Stone. ''It's the best software that's ever been developed for the system—names like *Contra, Double Dragon, Mike Tyson's Punch-Out!!* and *Gauntlet*.''

But quality software is only part of what's keeping *PlayChoice-10* in the running. The real power behind the product comes from the Nintendo people that stand behind it in the home office and in the field.

''It's team effort all the way in getting a product on the street,'' Stone remarked. ''Everyone plays a part in building in quality and innovation, then backing it up with service.''

At Nintendo of America's Redmond, Wash., headquarters, a research and development group of over 15 strong works on future coin-op products. Their effort is augmented by an R & D team in Japan of over 100 people. Sophisticated computer networking allows both sides to transmit and receive games for testing and evaluation via the phone lines.

To judge the playability and potential of games developed by Nintendo or other manufacturers, an in-house game evaluation team puts new games through their paces. Though it may seem like just play, this phase is a vital step in developing the next hit title.

Once a game has been successfully site-tested, it is ready for general distribution. Nintendo's respected sales team provides regional sales and marketing support of Nintendo's coin-op products. Their local representation gives Nintendo a better read on the problems and concerns of distributors and operators. And that has made a decided difference, according to company management, in building sound working relationships with them.

Supporting Nintendo's sales effort in the field is a home team of administrators, service technicians, and others who make it their job to assure smooth transactions and long-term customer satisfaction.

A smiling face . . . a pleasant and responsive voice on the phone . . . someone who is willing to go the extra distance to solve a problem . . . these are the human elements that add power to Nintendo's product line.

While some rumors may persist, Nintendo's coin-op division shows no sign of ill-health. In fact, its well-centered, excited, and moving ahead. ''Playing for keeps,'' as Arakawa said. But from the looks of it, though, it appears they're also playing to win.

Shipping department personnel, l to r: Francisco Vidal, Rick Peterson, Yo Cuong, Craig Aurelio, and Duane Meuchel.

Game play counselors, standing l to r: Jack McLain, Jim Wood, Tim Kiele, Jody Sage, and Cliff Hammond. Kneeling are Doug Baker (l) and Tim Dale.

Service department staff, standing l to r: Rick McManus, supervisor; Dennis Dove, John Tintinger, and Tom Oldfin, technicians. Seated is Jon Pedersen, director of technical services.

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Starbase Omega opens in Orlando

Starbase Omega, a major new amusement attraction for the Orlando, Fla., area and billed as "the ultimate laser game", officially opened on July 9 in the Mystery Fun House amusement complex.

Starbase Omega is the brainchild of Dr. David Peretz. His company, Blaster Tag International, and Mystery Fun House entered into an agreement for this joint venture earlier this year.

In *Starbase Omega*, patrons are brought to a different world via a vibrating transport chamber. Equipped with a laser gun, computer pack life support system, and target vest sensors, the galactic athletes compete in space gravity where they can run on the walls as well as flip and tumble.

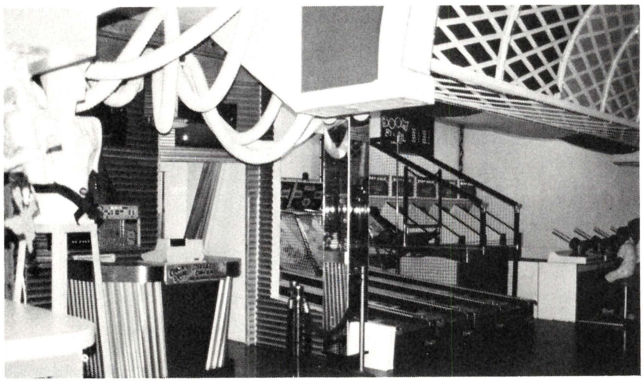
Peretz is hoping patrons will really "flip" for his idea, as they are overwhelmed by the space mist, black lights, UFO's, and cosmic volcanoes that add to the excitement of *Starbase Omega*. A huge, suspended UFO serves as a target and offers 1,500 lighting effects and six target levels.

Peretz is also the originator of a similar, interactive walk-through game, *Blaster Tag*, located in Miami.

Starbase Omega comes on the heels of competitive and interactive games like *Blaster Tag, Lazer Maze*, and *Planet Photon* that have become successful. Laser Tag games and similar spin-offs by a number of toy manufacturers have been popular gift items for children over the last two holiday seasons.

This latest venture for Peretz challenges competitors to use their laser guns to fire a visible beam of light to score points. The computer pack that each athlete wears keeps track of the hits and misses scored. At the end of the excursion to *Starbase Omega*, a master computer reads the information stored in the computer packs and the athletes are ranked.

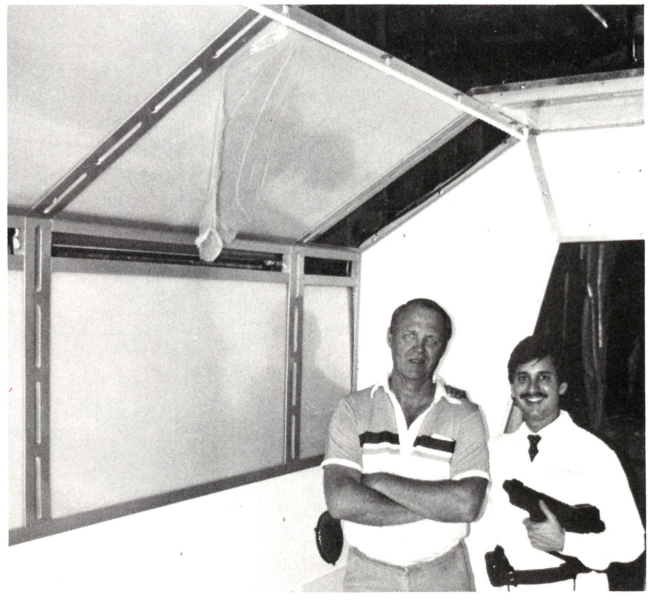
At the grand opening party the official character of *Starbase Omega*, Omega Man, gave demonstrations of his scat hovercraft, the official vehicle of the attraction.



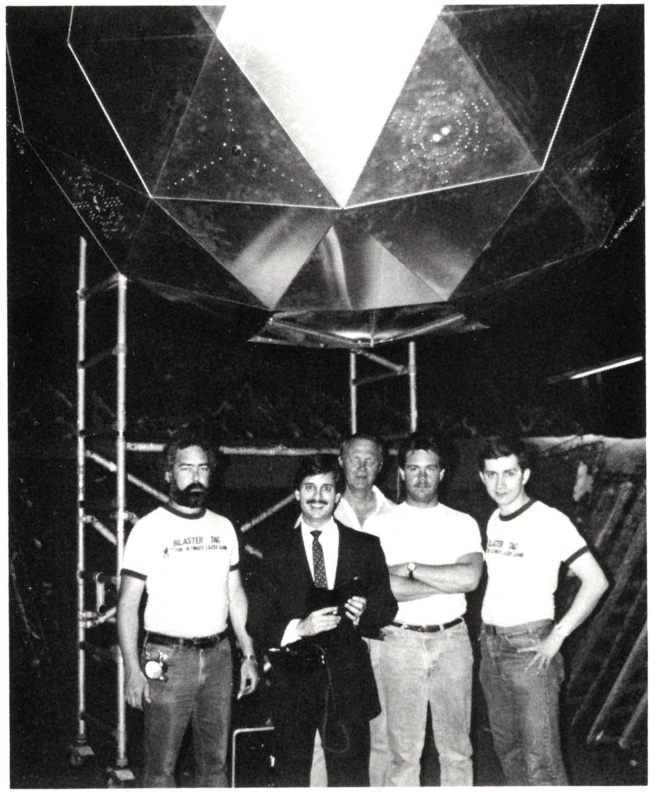
The entrance to *Starbase Omega*, Earth Station One, part of the game room of Mystery Fun House.

The Mystery Fun House, a family oriented amusement complex, also offers a game room, miniature golf, and other attractions. The Mystery Fun House and *Starbase Omega* are located at 5767 Major Blvd., Orlando, FL 32805; (305) 351-3357.

For more information, write Dr. David Peretz, Blaster Tag International, 1075 N.E. 125th St., Suite 201, N. Miami, FL 33161; (305) 891-4471.



Jack Spangler (l), Mystery Fun House manager and engineer, with David Peretz in the *Starbase Omega* transport chamber.



Originator and engineers standing under a suspended UFO, l to r: Jay Haze, David Peretz, Jack Spangler, and Gregg and Rod Chapman.

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Romstar shines in Chicago

An Italian feast at Chicago's Ristorante Italiano started off Romstar's distributor meeting to introduce its latest products. Distributors from all over the country were shown two new games from the company that has lead the industry in conversion kits. *Gold Medalist* is a plug-in conversion kit for *Gauntlet* four-player cabinets; kits for *Xenophobe* and *Rampage* will be available later.

Players choose from eight countries they wish to represent in nine different Olympic events—100 meter dash, swimming, high jump, discus throw, etc.

The second game, *China Gate*, is a two-player horizontal conversion kit. After selecting one of three characters they want to portray in this fantasy-fighting themed game, players then battle their way to recover the stolen "book of Sanzo."

Distributors felt that the price tags on these much-used-theme games were a bit higher than usual from a company that built its reputation on quality kits and reasonable prices.

Romstar invited the American Amusement Manufacturers Association executive vice president, Bob Fay, to bring distributors up to date on parallel boards. Romstar's Rene Lopez discussed distributor participation and possible strategies to combat excess Japanese inventory of Romstar games that are making their way to the U.S.

Clockwise from center: Steve Leiberman, Joel Kleinman, and Bob LeBlanc discuss new games.

Romstar crew introducing new product (from left): Joyce Kaehler, Tim Jackson, Takahito Yasuki, and Rene Lopez. With them is AAMA's Bob Fay.

Romstar's Joyce Kaehler caught snapping photos.

Even the boss loves to play! Romstar's Mr. Yasuki plays one of his games.

Rene Lopez demonstrates Romstar's games to distributors.

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U.S. GAMES, INC.

Sega shows new games

Sega invited distributors to Chicago in mid-June to preview the latest product from the California-based company. That Steak Joynt, a lavishly refurbished restaurant, was the setting for a little game of ''who dun it'' a murder mystery set in 1939 with Sega's guests in various roles. Tom Petit, for instance, became alter-ego, Toby Petit, an unfortunate victim.

Luckily Tom survived to acquaint distributors with some glitzy new Sega games. *Bulls Eye*, shown at ACME in March, was delayed to correct minor engineering problems such as curling targets and O-ring problems in the gun. Shipping is scheduled for late July and early August.

Altered Beast is Sega's new two-player, fantasy-themed conversion kit. Players transform in howling beasts with super powers to destroy the master boss and rescue the damsel in distress who has been taken hostage. Sega president, Tom Petit, told distributors that the adventure lasts longer than Sega's previous hit, *Shinobi* and the game can be set for 50-cent start and 25-cent add-a-coin.

''*Hot Rod* will be one of the great Sega driving games,'' assured Petit as distributors viewed this new three- and four-player model racing game. Players test their driving skills on 30 different levels of play. The game utilizes new technology and creative routines in programing, Petit added. The game has a floppy disc drive that downloads into a RAM bank that Petit claimed has been tested and is totally reliable.

Distributors were allowed a sneak preview of *Galaxy Force*, a space shoot 'em up available in upright or two different sit-down simulators that twist and turn for dramatic effect. The game will be highlighted at Sega's fall distributor meeting.

Tom Petit was the hapless victim in the who dun it murder mystery acted out by Sega's guests.

Distributors really got into their characters during the who dun it murder mystery.

Another version of *Galaxy Force* had distributors enthralled.

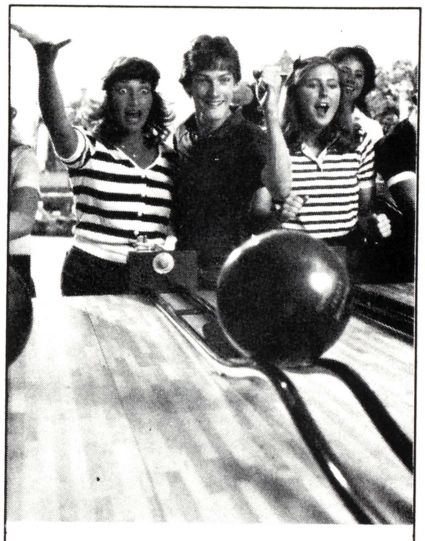
The cabinet design on *Galaxy Force* is outstanding.

Betson's Joe Cirello (left) and Banner's Don Bremer play *Altered Beast.*

Gary Gouse (left), Birmingham Vending with David Loethen of Sunshine Distributing.

From left: Sega's Shinji Kai and Howell Ivy with Dynamo's Bill Rickett, builder of the three-player *Hot Rod* cabinet.

From left: Tom Petit takes an order from C.A. Robinson's Sandy and Ira Bettelman.



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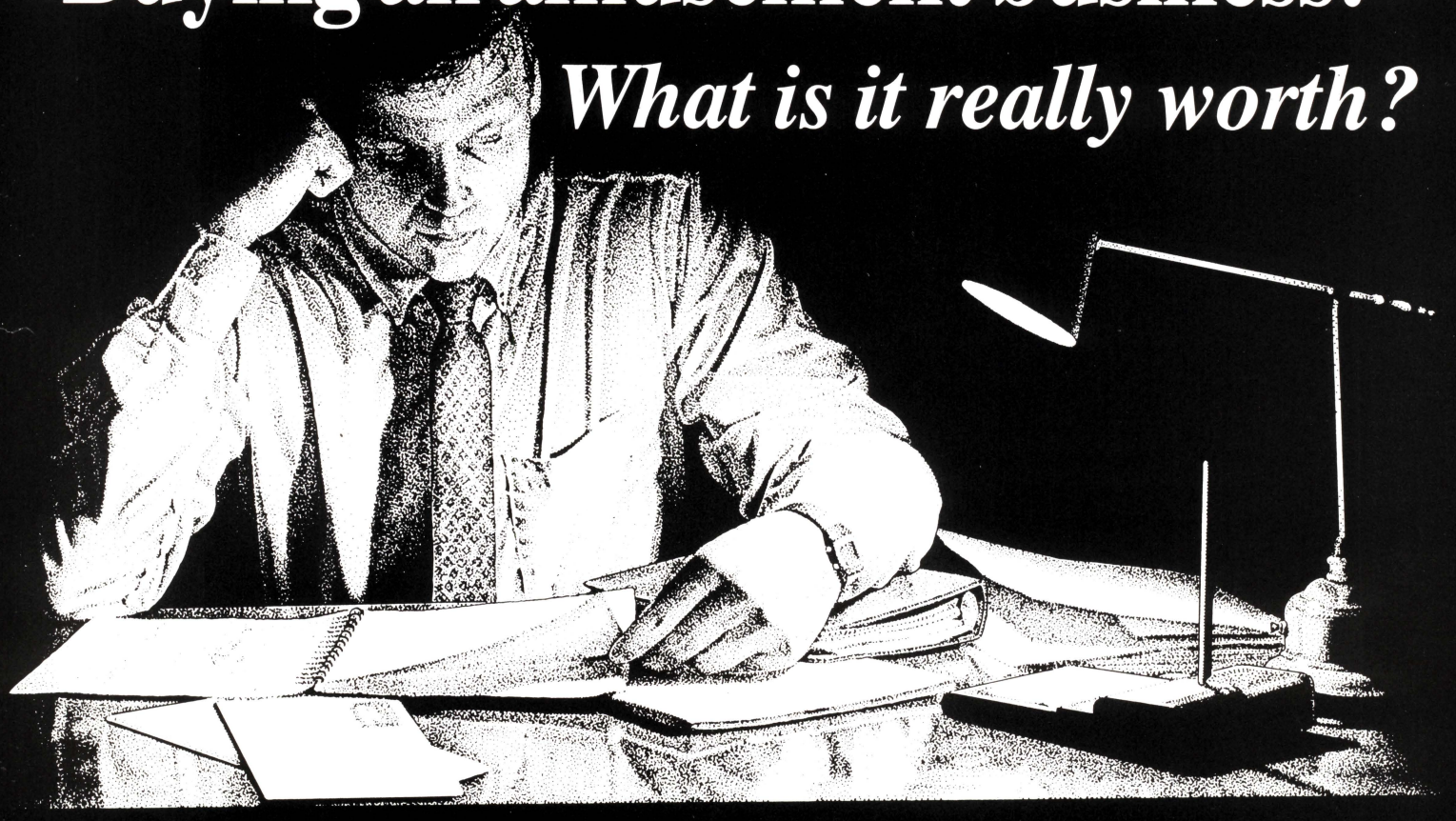
Buying an amusement business:

What is it really worth?



by Charles Ross

Editor's Note: This is a sequel to an earlier feature in our March '88 issue, What Is Your Business Really Worth? Charles Ross has made a thorough follow-up in this article that takes potential buyers step by step into negotiations for buying an amusement business.

The word is out. One of your competitors is interested in selling his amusement business. You think he has some good locations and equipment and you just might be interested. You call him and the negotiations are on . . .

What are you buying?

Before we can determine if the price is good, we must determine what you are buying. This may sound simple but it can be more complex than it appears. You could buy any one or combination of the following:

1. Amusement equipment only
2. Amusement equipment and other assets such as trucks, buildings, repair equipment, etc.
3. Just the locations without equipment
4. Locations and equipment on location
5. The employees
6. The company-owned arcades and leases
7. Location contracts

Once you have examined what you are buying, ask yourself another question . . .

Why do you want to buy the business?

A simple answer may be: To make money. But there may be other reasons, such as:

1. To control the market in your area.
2. To keep a competitor from getting the business.
3. To help absorb the cost of your present operation.
4. For prestige in the community.
5. To have fun.
6. A challenge to see if you can turn a losing operation into a money maker.

The answer to this question can give you insight and help determine what you are willing to pay, even though it may not be related to what the business is worth.

What is a business really worth?

Always remember that the value of the business is different for the buyer than for the seller. It can also be different from one potential buyer to another because of the motivations of each. The seller's motivations affect the price he places on his business while motivations of the buyer (see the list above) affect the value he places on it.

This difference is the reason for negotiations and when the negotiations work out, the business changes hands. The time has come to leave the generalities and get down to placing a value on the business.

Business valuation

Placing a value on the business you plan to buy is a process of finding the high and the low, taking your motivations into consideration, and determining what you will pay.

Wood Value or Liquidation Value

The best starting place is determining the ''wood value'' or liquidation value of the assets you are acquiring. This doesn't mean simply looking at the balance sheet the owner provides, even though it will give you a list of the assets. The value on the balance sheet is the book value, which is Cost (the owner's purchase price) less the Accumulated Depreciation (the depreciation expense accumulated each year he hs owned the asset). The book value is vastly different from what you should be willing to pay for the business and book value should not enter into the negotiations. The seller should consult with his

accountant to determine how the book value will impact him from a tax standpoint.

The liquidation value is what the business would sell for if each individual asset were sold separately. You can get equipment values from your distributors, valuation books, and even the classified ad section of Play Meter.

List all the equipment you are purchasing and the price you would have to pay for it if you were going to buy it from a distributor or at an auction. Also, list all the trucks and other equipment you're going to buy along with their values.

Total the list and you have a low value for the business. This is probably the best and lowest price you could hope to pay since there is no goodwill included and no value placed on any of the locations. Anything you pay over this figure is for such things as locations, location contracts, goodwill, and the earning value of the assets.

Valuation based on income statement

Most business owners will give you collection reports and a complete income statement of the business for you to evaluate. If you're not buying all the business, he may hesitate to give you a complete income statement and may offer only a collection report.

Caution: Do not get caught up in the gross revenue method of determining the

"Your motivations for buying the business will have an affect on the price that you are willing to pay."

value of a business when studying collection reports (Play Meter, March, 1988; page 56). Gross revenues and what the business is worth are two different values.

An operator once told me, "I want to buy a competitor out, he wants to sell. However, he won't turn loose of any collection tickets because he's afraid for me to know what he is making in case the deal falls through."

My response was, "It's going to be very difficult for you to place a value on the business without knowing what the

"Time is always considered an investment's enemy. The longer the time period the more things that can go wrong."

business is grossing. To make an intelligent decision you must start with gross receipts."

If you have a collection report, determine how much net income you are going to be able to make out of the equipment and locations you are buying. Your job will be to build an income statement around the collection reports. For example, say you are buying a route which is grossing $25,000 per month. How much is it going to cost you to operate that route?

You must consider all the costs you will incur: employee time, added travel expenses, added new equipment purchases to replace old equipment, added bookkeeping time, added repairs, etc. All of these must be estimated when you are considering buying a business.

In your evaluation don't ignore the added time you spend managing the new operation or you will think you are making more money than you really are. Your time is not free and it must be included to get a realistic picture of your return on investment. Assume someone else is going to do what you do and decide how much they should be paid. This will probably not be what you make, but part of what you take home represents a return on your investment.

We will look at return on investment in a minute, but first let us look at what to do if you are buying the entire operation and are given an income statement. Focus on the portion that applies to you. We will assume for the moment that the revenues are the same revenues you can expect to receive. So we move to the expenses. Which of the expenses listed on the income statement will you incur and which of the expenses will you be able to eliminate? Also, which expenses will you incur that are not listed on his income statement?

In other words you must add to, and eliminate from, the income statement so that it will mirror what you would expect from the operation when you take it over.

Notice the similarity between the two methods—where you are given an income statement and where you are not given one. It does not really matter if you get an income statement or just the gross revenues. Your job is to try to determine how much net income you can expect to receive from the new operation; in essence create an income statement that will reflect you running the operation.

You will notice that no mention has been made as to the split of the money with the locations. It does not matter if the split is 50 percent or 40 percent because what you are interested in is the income that you will

"Since time is so compressed in this industry and things happen fast, you must have a high return on your investment."

generate from the locations. Naturally the 40 percent payout to locations will make the company more valuable due to the higher net income that you will receive.

Return on investment, capitalization of earnings

Once you have arrived at a realistic net income we can then begin to place a realistic value on the business. Let us assume that from the $25,000 in gross revenues you estimate that your net income will be $5,000 per month. That means you estimate that you can make about $60,000 each year from the

operation which is grossing $300,000 a year. Don't be concerned with the actual number being used. Be more concerned with the methodology for determining the value of the business.

Let us assume that the asking price is $200,000. If you invested in the business your return on investment would be as follows;

Net Income $60,000
Investment $200,000 = 30%

You are getting a 30 percent return on your investment. Another way to look at the investment is this—it will take 3.3 years for you to recover your investment. The three and one-third years assumes that you do not increase the investment or make more than $60,000 each year. In reference to the previous article on the topic of selling your business, this 30 percent would be the capitalization rate.

Is the $200,000 a fair price? Before we answer the question let us look at one other thing. Let us assume that the time treasured method of one year of gross is the asking price of the business by the seller. That would make the sales price ($25,000 X 12) = $300,000 . If you were to pay that price for the business, then your return on investment drops to 20 percent and it takes the investment five years to pay for itself in terms of net profit. Strictly by the textbooks, this is not the way payback of an investment is calculated. But with depreciation being so real for the amusement business, it is a more practical method than the traditional method of taking Net Income and adding back depreciation expense to get cash flow; then determining how many years of cash flow it takes to recoup the investment.

Back to the question, Is a 30 percent return or a 20 percent return adequate in the amusement machine business? Every operator must answer the question for himself; but remember that the amusement machine business is a risky business. Also remember that time is always considered an investment's enemy. The longer the time period the more things that can go wrong.

If someone wanted to borrow money from you until the end of this week that is one thing. But when they ask to borrow the money from you for five years that is quite a different story. The longer the time period two things happen. First, there is a better chance that they will not pay you back; and second, they have your money tied up and you cannot invest it other places.

As with the loan, the shorter the time period for the return on your investment the greater the chances of your success. By all means the 30 percent return or the $200,000 price is a better and safer investment than the $300,000 price yielding a 20 percent return. As we all know, three years in the amusement machine business is equal to about 10 years in any other business. Since time is so compressed in this industry and things happen fast, you must have a high return on your investment.

Locations and location contracts

You could be buying the locations with or without equipment. Locations only have a value if they have the ability to earn money. There also needs to be a good chance that the location will be in business in the future. How much money should be added to the purchase price for a location? Actually, none. If you are using the capitalization of earnings method of valuation, then the value of the location has already been determined based on its ability to generate income for the business.

"What about location contracts?" you ask. Location contracts should be reviewed by your attorney to see if they can stand up in court. If they are valid contracts then, yes, they do add value to the business. Their value is difficult to set. A location contract lowers the risk that you will lose the location to a competitor. You must try to evaluate how real the risk of loss may be. Always remember this about contracts and any other items you may be acquiring. Does the item—be it employees, contracts, a piece of test equipment, or a long-term lease on an arcade—lower the risk that you will fail? If the item lowers the risk then it has value to you.

What are your opportunity costs?

Many times people overlook opportunity costs when they make investment decisions. What is the next best alternative use of the funds and time? In other words, Is this really the best use of your time and money and the money you plan to borrow to complete the deal?

Each investor must answer this

question. Unfortunately, only time will tell if you have made the correct decision. If you could buy an automobile dealership for the same $200,000 and make $80,000 each year on the investment, you should pass on the amusement business and take the autodealership.

What about the professionals?

Although Shakespeare said "The first thing we must do is kill all lawyers," there is a place for professionals such as attorneys and accountants in your business acquisition.

I would recommend that you follow this procedure. First, go out and find the business that you plan to buy. Get in there and do some analysis based on what you know about the amusement business and what you feel the future holds. Go over the books, the collection tickets, the equipment list, the locations, and anything else you think will have a bearing on the value of the business. Even go so far as to make your own evaluation of what you think the business is worth.

Now that you are all worked up and eager to hang your name on the front of the building, bring in a conservative accountant. Someone once said, "Accountants are like the street sweeper after a parade. They go along behind and clean up the mess." It is wise to employ an accountant to make sure that you do not get yourself into a mess. It is a lot easier to buy a business than it is to sell one, so bring in the "bean counters".

The accountant can have a much more level-headed approach to the business acquisition than you might and therein lies his strength and usefulness. Ask him his opinion and if he thinks the price is too high or too low. Without doing a full audit, get his opinion of the books and the net income shown. Don't waste his time and your money verifying the balance sheet. The main interest in the balance sheet is to determine the list of equipment you are acquiring and not verifying his accounting method of depreciating the assets. Of course we make an assumption that you do not take any of the liabilities of the previous business. If you are planning to take over the liabilities of the previous owner, then you will want to verify the balances on all loans and debts.

The bottom line is that your accountant can be very useful in your negotiations if you use him properly and listen to what he says. But I do strongly suggest that you let him see what you are about to do, before you do it, so he can advise you of any pitfalls he may be aware of that you have overlooked in your zeal to expand.

The deal is all set. Your accountant has come in and blessed the purchase. You and the seller are in agreement. In walks the expert of all experts—the attorney.

I think your attorney should be involved in the negotiations but I also think that you should remember who is paying whom. He works for you. His job is to protect you and help you get what you want and what is best for you. Bring your attorney in, but be sure his concerns are real.

Review of valuation

You now have some idea of how to value an amusement business.

1. Establish a liquidation value. That will be the lowest possible price you could hope for.

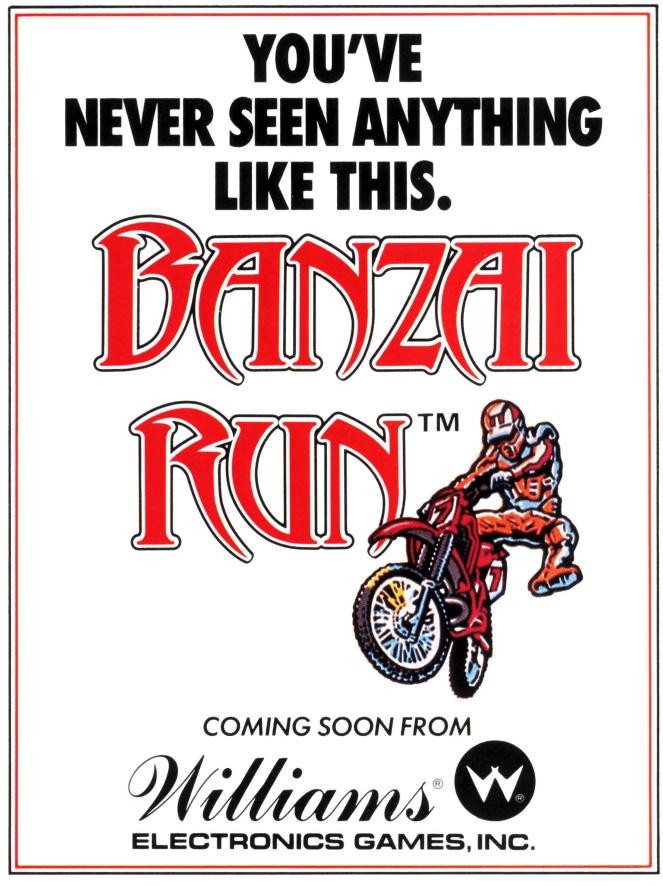
2. Prepare an income statement that you will face when you take over the operation. Now you can decide if you would be happy making that kind of income from the investment.

3. Capitalize the earnings and make return on investment calculations. Making an investment in an amusement business is really no different than buying a CD at the local bank. What kind of return are you going to get on your invested money? Capitalizing the earnings is the reverse of calculating the return on investment. In capitalizing earnings you start with the earnings and then use a risk-adjusted return to capitalize the earnings and arrive at a value for the company.

4. Finally, bring in the pros, but do it last. You do as much of the looking, digging, and question asking as possible, then get the blessings of the professionals.

Potential earnings also affect the price. These are earnings you think the operation can generate under your leadership. The potential earnings are very "iffy" at best. Do not place a very high value on these and perhaps they will be a windfall to you.

And remember that your motivations for buying the business will have an affect on the price that you are willing to pay. Let the negotiations begin!



Cleanliness matters, today and yesterday

Ten years ago, Play Meter sponsored a writer's contest and invited readers to submit their best industry-related stories. R.I. Lyttle's contribution was called, Soliloquy of a Pinball. In his article, Lyttle took a look at pinball maintenance through the eyes of a pinball machine. It began, "Remember me? I am the hottest, best-selling pinball of 1975. My name is not important, but the story I have to tell may interest you."

It went on, "I find it difficult to understand this person, my owner, as he is leaving. He has again neglected to give me two minutes of his time. In his excitement over the contents of the cashbox he has failed to notice the gathering grime." Of course, the story's point was that pinball machines need regular cleaning. Lyttle's article is as valid today as it was a decade ago. There's no substitute for thoroughness in the collection process and a good maintenance schedule adhered to by all company employees.

Play Meter interviewed Craig Singer of State Distributing in Dallas who was described as an individual who lives up to all his commitments, and a businessman with a tremendous amount of respect. Ten years ago malls were extremely reluctant to consider game rooms. Craig Singer had won the respect of many mall owners and was able to open his first mall location which he named Nickels and Dimes. One mall owner said of Craig, "There was some reluctance on the part of management to have an amusement center for fear of negative factors, such as loitering. But none of the bad effects have happened. He runs a very clean operation."

Craig told Play Meter that although he was apart from street operators, he was presenting the amusement industry to the shopping center industry in a new and creative way. Craig was one of the first to observe that arcades, or family amusement centers, were the wave of the future. He moved on his subject, contacting every shopping center developer in the U.S. and tallying a $800 phone bill one month. It paid off when he landed his first lease at Six Flags Mall in Arlington, Tex. In his coinman interview he discussed his philosophies on arcade operation. Regarding unruly patrons he stated, "If our customers don't abide by our rules, we don't let them come back."

Sky Diver by Atari

New products in August, 1988 included the four-player wide-body pinball, *Contact* by Williams and videos *Sky Diver* and *Smokey Joe* from Atari, plus the video poker *Hold and Draw* by Micro.

Smokey Joe by Atari

That issue also included a location cost analysis, the final installment in a series on the business analysis of an operation. Home games were also discussed (everything old is new again) as Gene Beley experimented with converting home video games into commercial units. Remember the Bally Home Library Computer for $300 that came with *Gunfight, Checkmate* and *Scribbling*?

Air hockey was the focus of attention at its national championship in Houston. Some of the top players then are still top players today, including Mark Robbins, Jesse Douty, and Phil Arnold. Players had suggestions for operators on methods of promoting the tables and rekindling interest in the sport at local levels. One suggestion was to sponsor a tournament once, then pick out the most enthusiastic player and let him take over running the tournaments, with the location providing the prize money.

Contact by Williams

Music Programming by Pat Matthews of station WQUE in New Orleans highlighted these songs, "Let Me Take You In My Arms Again" by James Darren, "Lady Blues" by George Benson, "Got To Get You Into My Life" by Earth Wind and Fire, "Love Theme From Laura Mars" by Barbra Streisand, "I've Always Been Crazy" by Waylon Jennings, "Brandy" by the O'Jays, "Easy From Now On" by Emmy Lou Harris, and "Give Me The Night" by Dusty Springfield."

In other music news, Play Meter's top 25 recordings started with "Miss You" by the Rolling Stones in the number one spot and "Prove It All Night" by Bruce Springstein in 25th place.

LARAMIE INTERESTS

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NEWS

Communidyne donates to MADD

Mothers Against Drunk Driving (MADD) recently held a benefit at a Chicago hot spot, coincidentally called Mother's, to raise funds for the Illinois chapter of its association.

Door County Coolers of Door County, Wis., co-sponsored the event which raised $1,600.

In addition, Communidyne, Inc. contributed its evening receipts from its alcohol *Breath Analyzer*, situated in the bar, and a check for $200 for a total of $233 donated to MADD.

Marti Page, MADD's state administrator, thanked Roger Gerber, president of Communidyne, for his continuous support of Illinois' MADD organization.

Roger Gerber of Communidyne presents check to Marti Page, MADD's Illinois state administrator.

Page recently participated in efforts to help support the mandatory auto liability insurance legislation passage in Illinois. Others contributing their support and time were Minni Minoso, former Chicago White Sox star, and Guardian Escort, a regional drive-home escort service for liquor-serving establishments.

Valley develops "spider" target

A new electronic dart target "spider", designated the *T-60/30 Target*, has been developed and is now being marketed by The Valley Co. of Bay City, Mich.

"This is something we have been working on for some time now," said Alan Schafer, vice president of marketing, "and we believe the coin games industry will be as fully excited about it as we are. We think everyone will see the difference at once when the new target is placed next to conventional targets."

The *T-60/30* gets its name from the differences it offers in reduced overall spider area and increased overall hitting area. It has an overall spider area reduced by as much as 60 percent when compared with electronic targets most commonly used today, while the hitting area is at least 30 percent greater.

"The new thin-line spider alone would make this new target a real breakthrough," adds Schafer, "but it is even more important when you consider the advantages to the avid electronic dart player and the operator. The player has a larger overall target area to aim at, and there will be far fewer bounce outs, as well as fewer broken tips. At the same time, scoring will be more accurate and positive because the player has a better chance of having his throw register exactly what it hits.

"Because it looks and plays more like the steel-tip game, this new target will have greater appeal to traditional players," added Schafer. Both the spider and segments are made of resilient fiber-filled nylon that reduces maintenance. The new target is available through Valley distributors and also in kit form compatible with existing Valley games.

AMOA plans more jukebox excitement

The Amusement and Music Operators Association (AMOA) has been busy planning activities for the first National Jukebox Month planned for this coming November, as well as the 100th anniversary of the jukebox in 1989.

It was on November 23, 1889 that the first jukebox appeared in the Palais Royale Saloon in San Francisco. Called *Nickel-in-the-Slot*, it was a modified version of the first phonograph invented by Thomas Edison a year earlier. Since then, the jukebox has entertained generations of Americans and has been a showcase of popular music. There are now an estimated 225,000 jukeboxes in commercial use nationwide.

Among the many planned activities is National Jukebox Month, supported by Rep. Robert Kastenmeier (D-Wis.) and his counterpart in the House, Rep. Carlos Moorhead (R-Calif.), who introduced House Joint Resolution (H.J. Res.) 446 to declare October 30-November 5, 1988, "National Jukebox Week". As of late May, 47 members of congress have signed to support the resolution (218 signatures are needed).

At its May meeting in Nashville, the AMOA board of directors held a reception for that city's musical community in honor of the jukebox. The affair was attended by recording artists and record executives.

While in Nashville, members of AMOA's jukebox promotion committee also met with representatives from the Recording Industry Association of America and major record labels to discuss possible promotions in the next 18 months.

Adolph Coors Co. of Golden, Colo., has appointed a task force to work with AMOA in developing special promotions around the jukebox for this November's National Jukebox Month as well as the 100th anniversary in 1989. Coors will be featuring nostalgia jukeboxes on Labor Day posters and TV commercials around the same time.

AMOA is developing a series of special jukebox-focused activities to be conducted during Expo '88 in Chicago this November.

The American Coin Machine Expo (ACME) sponsored by the manufacturer's association (AAMA) and Play Meter Magazine is also using a jukebox-inspired theme for its show to be held in Reno in late February. Show organizers wanted to help promote the jukebox and felt that using the "Play It Again" slogan along with a nostalgia jukebox logo would be appropriate.

SNK updates Fighting Golf

SNK Corp. of America has released a new program for its latest hit video, *Lee Trevino's Fighting Golf*, featured on the cover of Play Meter last month. The new program allows novice golfers additional time to aim, select clubs, and make shots.

The original program's swing time was operator selectable for 10 to 12 seconds, compared to 12 to 15 seconds on the new program. The Power Gauge (swing gauge) moves slower when the ball is on the green to allow greater accuracy when putting. Finally, the hit check area around the cup has been expanded, allowing easier putting.

Lee Trevino's Fighting Golf

SNK has made these ROMs available for all operators who feel it would enhance player acceptance of the game. The update ROMs have been shipped in quantities to all SNK authorized distributors and are available on request at no charge to owners of the original game. All new games will have the updated program installed.

Hilltop opens in W. Virginia

Hilltop Distributing in Weirton, W. Va., opened its doors as a full line, privately funded distributorship in mid-June. Heading up the Hilltop team is Doug Wilson, former Banner Specialty vice president.

The Hilltop employees represent many years of experience in the coin-op industry. According to Wilson, "Our business philosophies are being openly welcomed and at the same time being "fine tuned" to better suit the needs of our customers. We have been fortunate in realizing tremendous manufacturer and customer support, and as a tribute to our competition, many have offered their support," said Wilson.

To contact Doug and his staff, Hilltop's address and phone number are: 404 Penco Road, Weirton, W. VA 26062; (800) 537-5755, (304) 723-3195, or FAX: (304) 723-0041.

J-S Sales promotes three

J-S Sales of Mt. Vernon, N.Y., has promoted key personnel as part of its commitment to expansion.

John Nusser has been promoted to general manager after two years with the company. His experience in the coin-op industry includes many years with Bally-Ireland.

Jeff Blackoff has been promoted to national telemarketing manager. A member of the sales team for seven years, he will be managing, training and directing J-S's growing in-house telemarketing staff.

Jim Royston, after eight years as New York/New Jersey regional sales representative, will assume the position of southwest regional sales manager. He will head the company's expansion into the southwest.

To contact Nusser, Blackoff, and Royston, write or call J-S at its new address: Five South Fulton Ave., Mt. Vernon, NY 10550; (914) 668-8051 or (212) 324-3830.

Williams revises Big Guns software

Williams Electronics Games, Inc. has announced a major software revision for its *Big Guns* pinball game. In selected sites Revision A has delivered an immediate impact on collections, some reported to be up 20 percent.

The revision is easy to install: just change the game chips and optionally remove a single post on the playfield.

Big Guns

Features of the new software include:

- Anti-chatter slings (kickers) which are more maintenance free
- Fast auto-replay scoring
- Improved pay-out controls for extra balls
- More responsive logic and liberalized rules
- Advanced fault-tolerant software for minimum downtime

For more information contact your local distributor or Williams for referral.

Arjay Export expands office

Arjay Export Co. has moved to larger facilities in Hyannis, Mass. Arjay will share the space with its subsidiary, Prestige Games Inc., which produces the popular *Quarterhorse* game.

The move, according to Arjay's Bob Jones, was necessary because the growing

Bob Jones and Walleska Grajales in the new Arjay Export facility.

demand for *Quarterhorse* made it imperative to be able to produce that game under controlled conditions in the U.S. Previously, the game was produced entirely in Canada and brought to Miami for final assembly. Jones added that since the game has been so well received in many countries, the company plans to continue to improve the components to offer its customers the finest coin-operated machine available.

Arjay and Prestige can be reached at their new address: 119-A Thornton Drive, Hyannis, MA 02601; (617) 771-6088 or FAX: (617) 771-6119.

NVS forms new buying group

Nationwide Vending Services (NVS), a vending management firm providing clients with a comprehensive accountability program for all coin operated machines, has formed the NVS Buying Group.

Zachary Katz, director of special projects, said, "We recently began a survey of our operator/affiliates. The results of this survey will provide us with the necessary information to approach machine and equipment manufacturers, as well as product suppliers, with documented assessments of the actual buying power we represent. "The NVS Buying Group will allow us not only to take advantage of our huge economies of scale, but provide participating suppliers with a unique, efficient method of marketing their products."

Fred Pollak, Dan Brown, and F.J. Pollak are the principals of NVS which subcontracts to 1,400 local vending, music, and amusement operator/affiliates in all 50 states. The expanding client list includes more than 65 well-known corporations in hospitality, restaurant, night club, health care, retail, and transportation fields. Nationwide tracks local machine sales, collecting and accounting for revenues, and producing reports that detail marketing data on each machine, by product and location.

Nationwide can be reached at (714) 981-7752.

Standard moves

Standard Change-Makers' Los Angeles regional office and Nik-O-Lok's Los Angeles office have moved to new and larger facilities in Santa Fe Springs, Calif.

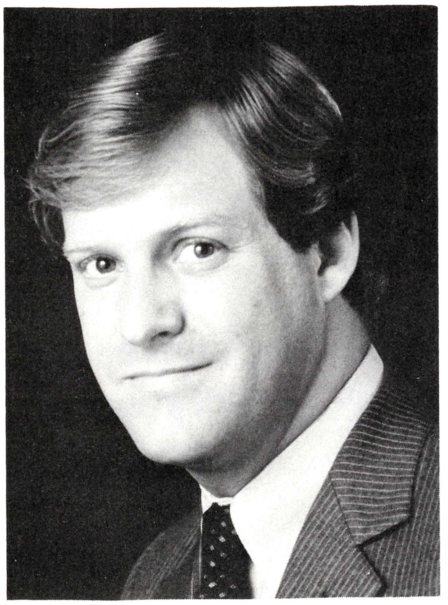
The expansion will accommodate improved technical and service departments to better serve customers. There are currently three technicians at the western regional office and service center.

Standard Change-Makers staff, l to r: Jack Ewald, Bill Keller, Katie Hauser, Glenn Leaf, Tony Chavez, Tony D'Ambrosio, and Andres Alacorn.

To contact John Ewald, western regional manager, or other staff members, the new address and phone number are: 11731 Telegraph Road, Suite C, Santa Fe Springs, CA 90670; (213) 942-7188 or FAX: (213) 801-1180.

Lundquist becomes Axlon president

Bob Lundquist, executive vice president of Bally Midway-Sente, has resigned from Bally to become president of Axlon Inc., a toy manufacturing company in Sunnyvale, Calif.



Bob Lundquist

Although he will no longer be directly involved in the day to day operation at Bally, he will continue an association with the company in a consulting capacity for a period of time.

Axlon and Nolan Bushnell have announced plans to enter the coin-op business and as such have obtained the development and distribution rights for the Sente System from Bally.

Lundquist stated that his time with Bally had been both personally and professionally rewarding.

NLBA expects big convention crowd

Over 2,000 tavern and restaurant owners from all over America are expected Oct. 30-Nov. 2 at the Las Vegas Hilton for the 39th Annual Convention and Trade Show sponsored by the National Licensed Beverage Association (NLBA).

NLBA is the only national association devoted to the needs of America's quarter-million fully licensed bars and taverns. Each year the NLBA Convention and Trade Show brings large numbers of independent business owners together to meet with their major suppliers in an entertaining, yet business-oriented atmosphere.

NLBA president, Tom Flynn, announced details of this year's program. Hourly cash and merchandise awards guarantee heavy customer traffic throughout the trade show hours.

For more information on booth space or reservations contact NLBA trade show manager, Sally Paul (703) 671-7575. Or write to NLBA, 4214 King St. West, Alexandria,VA 22302.

NAMA responds to Koop assertions

The National Automatic Merchandising Association (NAMA) is again defending the sale of cigaretues in vending machines following a call by surgeon general Dr. C. Everett Koop to ban such sales.

Walter Reed, director of public relations for NAMA, responded in a letter to Koop. In part, his letter stated that cigarette vending machine operators "take uniform and heated exception to your assertion that cigarette machines are a principal source

of cigarettes to minors and are a paramount contributor to their delinquency.

"Nothing could be further from the truth. The fact is that minors rarely purchase cigarettes from vending machines. To suggest otherwise is to trivialize the issue in which you are so strongly interested. Current surveys show that close to 80 percent of cigarette vending machines are located where teenagers are not allowed or rarely frequent. Vending's share of the entire retail cigarette market is less than six percent."

Reed enclosed facts about cigarette vending in an effort to help Koop refocus attention on the major sources of cigarette sales to minors. A January 1988 study by Leonard Jason of De Paul University revealed that minors obtain cigarettes at gas stations, supermarkets, drug stores, and through friends.

Vending machines cannot be unfairly singled out as a major source for under-age smokers. Better enforcement of currently existing laws on the state level would be a step in the right direction of deterring minors from smoking.

Dynamo names Brady

Dynamo Corp., famous for pool, foosball, and air hockey tables, and cabinet building, has appointed Chris Brady as regional sales manager.

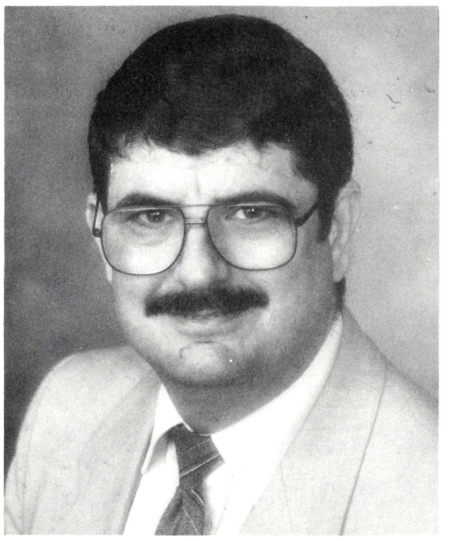
Brady has an extensive marketing background in the oil and gas industry. He will cover the midwest and northeast areas of the country and report directly to Mark Struhs, vice president of sales and marketing.

Brady can be reached at Dynamo, (800) 527-6054 or (817) 589-7699.

Chris Brady

Gleason opens Consignment City

Twenty-year industry veteran Charles Gleason has started his own company, Consignment City, that lets operators sell, buy, or trade coin-op equipment with each other.



Charles Gleason

Gleason prepares computer listings of available games (primarily used) and desired games for distribution in newsletter form. He acts as an agent, contacting customers and preparing the lists.

His first newsletter came out in mid-June and included such time-proven favorites as *Pole Position* and *Spy Hunter* in the video category and *Eight Ball Champ* and *Firepower* in pinball. Everything from pool tables to jukeboxes, from a *Space Invaders* cocktail to a new *Super Poker*, appears on the list. Prices and game conditions are includ d. Listings are free.

Gleason is presently located in the Dynasty Amusement office complex. For more information, write Consignment City, 3229 Edenborn St., Metairie, LA 70002; (504) 887-3114.

Amusement World expands facility

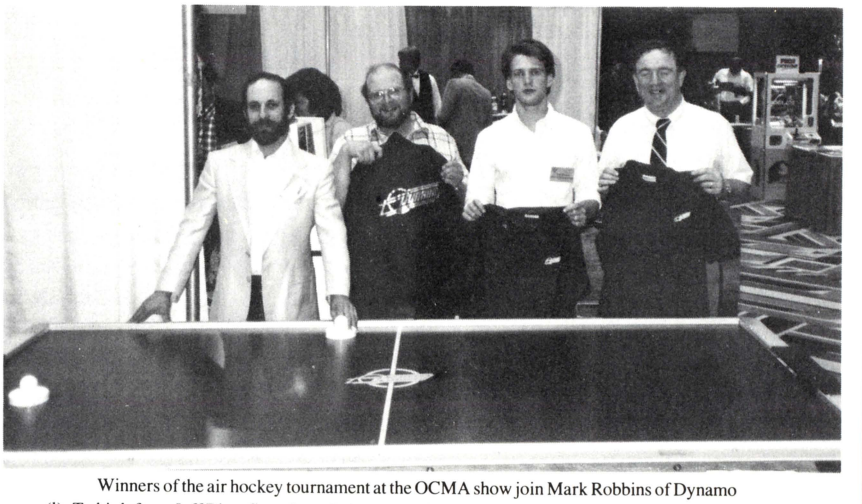
Amusement World/Electro-Sport East has moved to a new, expanded, full-service facility.

As National Service Center for the full range of E.S.I. products (*Poker I-II-III, Dwarfs Den, Super Poker/Dwarf* and *Quarter Horse*) Amusement World has supplied service, technical assistance, and parts back-up for many years. The new facility will allow the technical staff to respond to customer needs more efficiently. Many problems can be solved over the phone.

The Amusement World staff welcomes calls at its toll free number (800) 426-3100 or (301) 747-2300. The new address is Amusement World, Inc. (Electro-Sport East), 5621 Baltimore National Pike, Baltimore, MD 21228.

AAMA exhibits at industry events

The American Amusement Machine Association (AAMA) has exhibited at many industry events thusfar in 1988 and



Winners of the air hockey tournament at the OCMA show join Mark Robbins of Dynamo (l). To his left are Jeff Ries, first place; Brian Sutterfield, second place; and Bruce Hoff man, third place.

has a full schedule of important upcoming occasions to cover.

AAMA participation in these events is designed to increase awareness of the coin-operated entertainment industry and reinforce the idea of local amusement machine operators as important contributors to the local economy.

The list of events remaining on the AAMA calendar are:

Sept. 25-28—National Association of Convenience Stores (NACS) Convention, Las Vegas Convention Center.

Oct. 3-7—Japanese Amusement Machine Manufacturer's Association (JAMMA) Trade Show, Tokyo, Japan.

Oct. 6-9—National Recreation and Park Association Convention, Indiana Convention Center, Indianapolis.

Oct. 30-Nov. 2—National Licensed Beverage Association (NLBA) Convention, Las Vegas Hilton, Las Vegas, Nev.

Nov. 3-5—Amusement and Music Operators Association (AMOA) Expo, Chicago Hyatt, Chicago.

Nov. 16-18—International Association of Amusement Parks and Attractions (IAAPA) Trade Show, Dallas.

Ernest Telecom has Instant Refund

Ernest Telecom, Inc., a manufacturer of public telephones, announces the release of a new feature for its models 7DW, 7C, and Universal II: Instant Refund.

Instant Refund will allow the telephone operator to verify and credit incomplete calls as well as return any coins held in escrow. This feature allows a caller to obtain an instant refund or credit and eliminates any refund burden for either the location or operating company. Pay telephone operators should also eliminate the administrative cost of sending small checks to callers.

Joe Ernest, president of Ernest Telecom, stated, "This is the kind of innovation the private industry has brought to the pay telephone market place. Our goal is to continually find new ways to benefit the consumer and improve upon the level of service established by the regulated telephone companies."

Included in this product is additional software to allow zero plus direct access with ITI's automated operator service. Also, new call screening and separation of local, intra-lata intrastate, intra-lata interstate, inter-lata and international has been added to allow operators to redirect traffic for maximum profit and to meet changing state regulations.

In other company news, Myron Newman has been appointed director of corporate accounts.

Newman has successful background in the telecommunications industry, most recently with MCI, where he helped pioneer the alternative operator service industry in handling network management for National Telephone Service (NTS).

He will lead Ernest Telecom's nationwide management program for multi-state accounts. The company and its distributors currently manage corporate accounts in more than 10 states.

Coreland purchases Technostar in Japan

Coreland Technology of Tokyo, Japan, recently purchased Technostar Co. Norio Yasuda, president of Technostar, has been named executive director of research and development at Coreland.

Yasuda's career includes a period as manager of research and development at Sega Enterprises where he was involved in early flight simulator games, and time in research and development at Konami.

Coreland is currently working on a new video, *Cyber Tank*, not yet released to the marketplace. Yasuda's experience will be an asset in the development of future Coreland products.

Snyder travels for presentations

Bob Snyder of Bob Snyder and Associates, amusement game consultants, has been on the road recently making a presentation to the management of the Holiday Hotel and Casino on behalf of NTN Communications.

NTN is a west coast company that provides satellite broadcasts of location computer participation video games, sports contests, and weather and news reports 24 hours a day. The California system uplinks to Satellite Westar 4, transmitting the programming to subscribers throughout Canada and the U.S.

Snyder and a staff member also participated in national and international gambling conferences in San Diego, Calif., and Vancouver, Canada.

The San Diego conference was sponsored by the National Association of Gambling Regulatory Agencies. The Canadian conference was the National Symposium on Lotteries and Gambling.

Illinois court grants exemption

Illinois vending companies are not liable for state sales tax for vended food items which are prepackaged by the manufacturer, the Illinois Supreme Court decided in a ruling late last month, said William Brandstrader, counsel for the National Automatic Merchandising Association (NAMA).

Included in the decision are vending machine items such as candy, chips, pastries, pretzels, ice cream, and milk. Hot foods, coffee, soft drinks, sandwiches, fruit, prepackaged puddings, and those packaged by the vending company are not exempt from the tax, Brandstrader said.

Canteen Corporation had sued the Illinois Department of Revenue claiming that vended products should not be treated like those sold through other retail channels under legislation adopted in 1980. Some 50 other Illinois vending companies also had filed for credit in 1983 in opposition to the Revenue Department ruling.

Brandstrader said that companies are due a tax credit for canned soft drink sales taxes paid through January 1, 1985. At that time the legislature ended the sales tax exemption for soft drinks.

"This decision is welcome news to vending companies and justifies our nine years of work and faith that a favorable ruling would result when the court action was initiated," Brandstrader said.

He estimates that the ruling will result in credits toward future sales tax liability of approximately $20 million for the companies which have filed claims, and that the net savings for Illinois vending operators will amount to some $4.5 million on an annual basis in future years.

Video Invasion does it up "Big"

Video Invasion of Toronto, Ontario, Canada, has joined forces with 20th Century Fox for summertime promotions.

The first involves the new Tom Hanks' movie, "Big", which prominently displayed the Williams' pinball *PinBot* that appears in the bedroom of Hanks' character. Pinballs also appeared in a key scene in which the leading character approaches a coin-op fortune telling machine in a boardwalk game arcade.

Wayne Fromm of Video Invasion recently sponsored a special screening of the movie along with 20th Century Fox and the Cineplex-Odeon Corp. in downtown Toronto at a twin screen cinema. Over 750 people attended this screening.

Video Invasion patrons qualified for tickets to this screening by competing on Williams' *Big Guns*. In addition to movie passes, winners received "Big" T-shirts, movie posters, and game tokens.

Fromm visited the Williams' factory in Chicago to present T-shirts to Tom Cahill, Steve Kordek, Barry Oursler, and Roger Sharpe. Fromm challenged the pinball pros to a game on the new *Banzai Run*.

Wayne Fromm of Video Invasion presents "Big" T-shirt to Tom Cahill of Williams.

Wayne Fromm, far left, visits Williams' staff, l to r: Barry Oursler, Roger Sharpe, Tom Cahill, and Steve Kordek.

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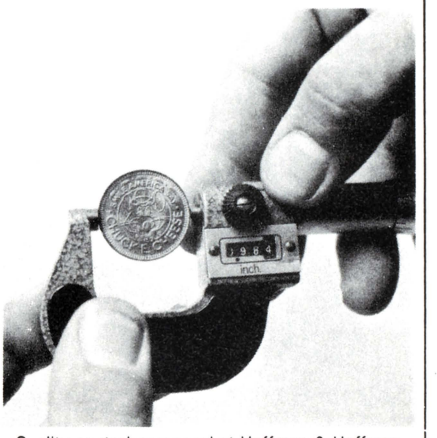

Quality control personnel at Hoffman & Hoffman checking diameter of token with micrometer

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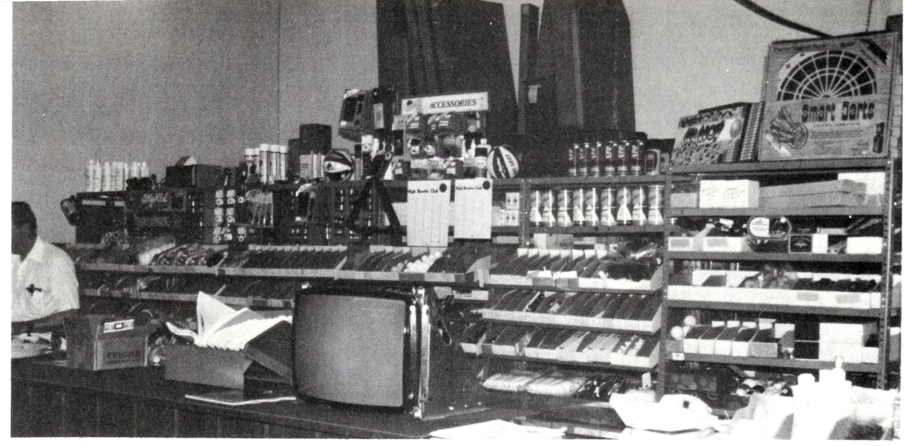
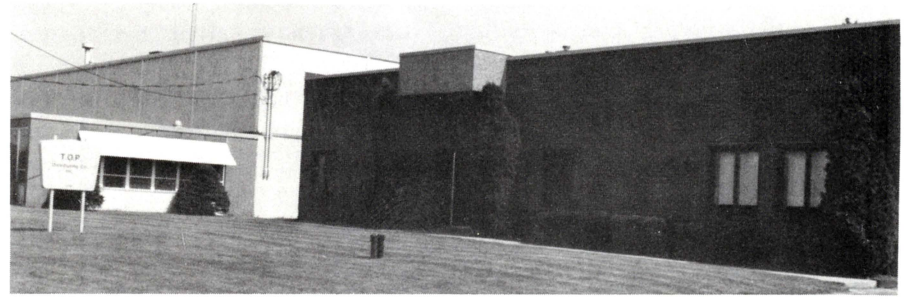
T.O.P. expands in Syracuse

T.O.P. Distributing has moved its Syracuse office into a spacious, 9,000 square foot building just a mile up from the old office building. Matt Tarantelli noted that, with the move, the Syracuse office has doubled in size. "We needed more space to expand our parts and service departments to better handle our customers' needs," explained Matt.

As you can see from the photos, the new office has a generous show room and an ample, well-stocked parts department all in a modern, new building.

The address and phone numbers in Syracuse are: 6116 Boss Road, Syracuse 13211; (800)643-6363 in N.Y.; (800)321-8671 outside N.Y.; and (315)437-8371. T.O.P. headquarters are in Rochester, New York: the address and phone numbers there are: 739 Linden Ave., Rochester 14625; (800)222-8671 in N.Y.; (800)872-5656 outside N.Y.; and (716)586-1100.





A money-back offer on a Gottlieb

What possibly could be better than buying a really good Gottlieb pinball game? The answer, of course, is getting money back!

At least that's what Premier Technology, makers of the famous Gottlieb pinball machines, is offering—buy a Gottlieb and get money back. Premier has gone to the source by sending $200 rebate coupons directly to operators to use when purchasing Premier's latest game, *Robo War*, from their authorized distributor.

With the coupons out only three weeks, Premier's Bob Mueller is already pleased with the response. "So far the response has been great," he said. "We are, of course, hopeful that it will continue as such."

Bob came to Premier just a year ago, but has already carved his niche in this industry. He has gotten to know the coin-op industry and is trying out some new ideas. "I don't know if any other manufacturer has tried giving rebates directly to operators but I think this is the way to reach them." he reflected.

Coming from the auto industry, Bob has incorporated some successful ideas he learned from that industry into his current job. Rebates direct to customers is certainly not new for car buyers, but operators may find it a pleasant surprise. "We wanted to go direct to the operator and explain to him our refund coupon program. This way the operator can go to his distributor, buy a Gottlieb, and get $200 back." added Bob.

"I'd like to stress, though, that our objective here is to create an awareness of our game, one we know is good, and at the same time, increase our total product exposure out in the field. We discussed the concept with several key distributors before initiating the program and they were all for it. We sent our distributors plenty of brochures and told them about our offer so they could tie in with their own local promotions."

Robo War features some changes and improvements initiated by operators. Some of the highlights are an all plywood cabinet and a hinged display panel for easy access to components inside the backglass.

ICMOA hosts annual event

The Illinois Coin Machine Operators Association (ICMOA) welcomed over 160 attendees to its annual meeting and trade show June 10-12 at the Pheasant Run Resort in St. Charles, Ill.

The event opened with a president's reception and included an association general session, exhibits occupying 30 booths, a manufacturer's program on industry trends, a banquet, awards, and the ICMOA-PAC auction. Included in the program was a briefing session with Dan Seltzer of Seltzer & Cohen, who explained the new AMOA insurance program.

Among the exhibitors were: Ace Novelty, American Vending Sales, Amusement Emporium, Atlas Distributing, Brandt, Dan Brechner & Co., Dart World, Frey & Frey Enterprises, Games of Tennessee, Johnston Products, K.A.T., Kang Enterprises, Merit Industries, Owl Darts, Streak-Shooter, The Valley Co., Wico Distribution Co., and World Wide Distributors, which co-sponsored the president's reception.

During the business meeting, officers and board members were elected for the next two years. New officers are: Ed Velasquez, Velasquez Automatic Music, president; Dwain Kramzar, Kramzar Amusement, first vice president; Stan Williams, Williams Enterprises, secretary; and Jay Abraham, Joe Abraham & Sons Amusement, treasurer.

Vice presidents include: Don Waldron, Northgate Amusement; Rudi Kit, Suburban Vending Service; and Jimmy LaCost, LaCost Amusement. Directors for the term are: Don Hesch, A.H. Entertainers; Bill Prather, Bee-J Amusements; Mike Paisley, M&M Vending; Thomas Fiedler, Melody Entertainment; Kem Thom, Western Automatic Music; Mike Holl, Erickson & Holl; Ted Furkin, Allstar Music; and Roy Phillips, Smith Amusement.

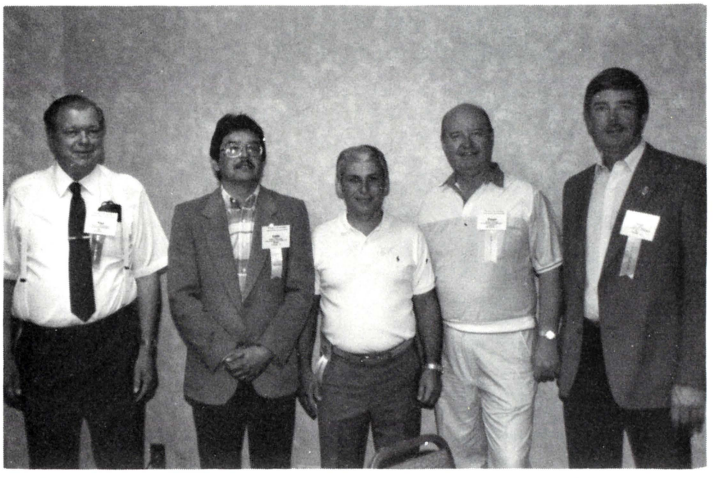
Associate members include Frank Gumma, Jr., American Vending Sales; Scott Lippman, Atlas Distributing; and Doug Skor, World Wide Distributors. Serving on the past president's council are Paul Hoffmeister, P&M Enterprises; Walt Lowry, Lowry Music; and Dave Marik, Rockford Star Games.

Awards presented at the banquet included one to Paul Hoffmeister for his term as president, plus awards to American Vending Sales, Atlas Distributing, and World Wide Distributors for their dedication and continued support of the association.

Chuck Milhem of The Valley Co. accepted a token of appreciation for his role as official PAC auctioneer. This year's auction goal was $25,000 and the membership raised $28,000. Manufacturers generously donated to the auction, helping ICMOA surpass the goal. PAC funds are extremely important to all state associations since they help secure solid representation in the legislative process. Congratulations to ICMOA members for this fine effort.

Ed Velasquez of Velasquez Automatic Music (far left), cuts the ribbon to officially open the ICMOA show.

Doug Skor of World Wide Distributors (r), accepts an award for his company's support of ICMOA from Mike Holl of Erickson & Holl.



Paul Hoffmeister (far left), outgoing ICMOA president, with new officers, from left: Ed Velasquez, Jay Abraham, Dwain Kramzar, and Stan Williams.

The gang's all here, from left: Jim Richie (sales manager), Rosie Perez, Cliff Young, Tom Klimek, Jackie Dove, and Mike Silverstein.

P.M.I. goes international

P.M.I. Toys & Novelties entered the marketplace of crane and redemption merchandise just two short years ago and already has an office in Hong Kong and joint ventures in Korea and China where it has established its own factories. The European market is next on the expansion list as the company will soon open an office in Spain.

The chief "mover and shaker" of the operation is the vice president, Mike Silverstein, a 25-year toy distribution veteran who is backed by the forward thinking of a parent company with 12 successful years in restaurant management. P.M.I. Toys is an independent company that operates under the umbrella of Pizza Management, Inc. (PMI), a company with almost 200 Pizza Hut restaurants in the U.S., Virgin Islands, Puerto Rico, and Spain; plus Taco Bells and other restaurant locations.

A need for quality crane merchandise to feed its 165 company-owned cranes led to the formation of P.M.I. Toys and Novelties. During a past product shortage, PMI chairman and president, Arturo Torres, traveled to Asia and began purchasing crane plush direct. Forming a new company for that express purpose was just the right move. P.M.I. Toys first exhibited at the AMOA Expo '87 in Chicago and again at ACME '88 in Reno in addition to spreading its name regionally at state shows.

Silverstein, well-known in the toy market and previously southwest sales manager for another large importer of plush supplies, is dedicated to building P.M.I. Toys into a solid leader in the industry.

Drawing on his vast experience, Silverstein deals with customers on a daily basis and keeps "in tune" with the pulse of the business. He is accessible and freely gives advice on the best methods of stocking and operating cranes.

Silverstein was one of the first to recognize the impact of cranes on the amusement business and vigorously pursue the crane and redemption merchandise market.

"I believe that every company should listen to its customers and understand their problems and opportunities," said Silverstein. "Every customer wants new merchandise and we will prove to them that we are committed to bringing in an exciting line."

The current catalog includes successful items like the fuzzy lion and boy and girl mice. A summertime hit was the barbeque dog—a canine dressed as an outdoor cook. The catalog also features some unusual items like the three little pigs, rag dolls, crayon bears, purple monster, fat penguin, and seasonal items.

In addition, there are the teddy bears, dinosaurs, puppies, tigers, and flamingos that are more familiar crane prizes. P.M.I.'s toys that add color and interest to cranes include comical watches, beaded necklaces, football or helmet clocks, and bracelet and earring sets. LCD and jewelry items are packaged on a colorful sponge base that's easy to spot and retrieve with a claw.

Silverstein travels to China, Taiwan, and Korea in search of the new and unusual in plush and toy selections. A staunch advocate of the saying, "winners make players," Silverstein

Mike Silverstein, P.M.I. Toys' vice president, with Rosie Perez, executive secretary.

believes in a fair payout to crane customers, knowing they will be satisfied and return to try for more prizes.

P.M.I. Toys has prospered under Silverstein's leadership. He has surrounded himself with capable personnel who understand the business. Torres, head of both P.M.I. Toys and the parent company PMI, stated, "I have all the confidence in the world that Mike can make P.M.I. Toys and Novelties into a strong leader in the toy industry." Torres, a self-made man, emigrated to the U.S. from Cuba in the early 1960's and has built his company from the ground up to its present size of 3,000 employees.

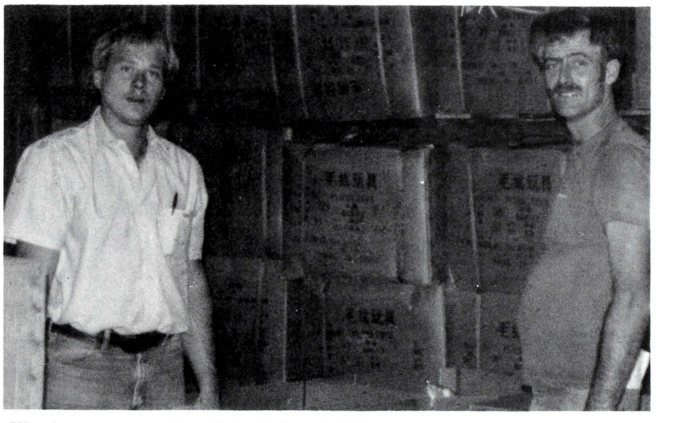
Silverstein commented, "My relationship with Art is a special one and I am grateful for the opportunity he has given me to pursue a lifelong ambition." Directing a company in the business he loves has been a dream of Silverstein's.

This love has not clouded his realistic view of the business and he notes that there is no really cheap merchandise, unless it is only very small pieces. There's a 40 percent increase in costs overseas, he explained, that affects our market in the U.S. High quality product and fair operation of the equipment will still mean good revenue for cranes and redemption games.

Currently P.M.I. Toys is specializing in plush items, but is planning to broaden the company's line in the near future to include hard goods for redemption centers; plus merchandise for rotaries and carnival merchandise.

Anyone interested in seeking advice on plush selections can contact Silverstein at either of two locations: his office in Dallas (800) 638-3833, FAX 214-226-4625; or the P.M.I. office and showroom at 4310 Tejasco, San Antonio, TX 78218, (800) 445-6403 (USA) or (800) 451-1204 (TX), FAX 512-824-6565.

Jackie Dove, receptionist, and Bob Burt, accounting manager.



Warehouse manager Tom Klimek (l) and Cliff Young handle large shipments from overseas.

Come September

Just what you've been waiting for . . .

Play Meter's Fall Buyer's Guide

of cranes and redemption equipment, table games, kiddie rides, novelty games, speciality items, pay phones, bowlers, and basketball!

GUEST COMMENTARY

Travel Proves Enlightening

by Bob Rondeau

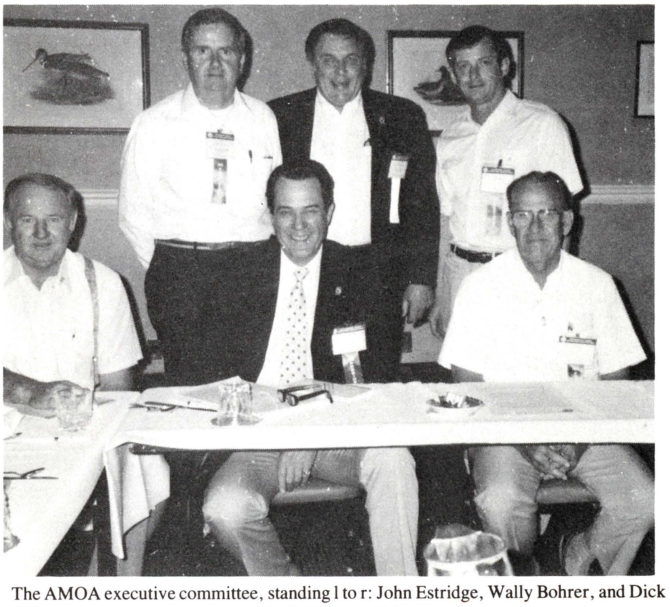
Although I have been with Bally for the past 35 years doing everything, I found that my last assignments, attending the Ohio Coin Machine Association (OCMA) show, talking to the Amusement and Music Operations Association (AMOA) in Nashville, going to the Washington Conference and later to the Mississippi Coin Operators Association (MCOA) show, to be as interesting and educational as they get.

My wife, Bev, works with me on 90 percent of my assignments. We have been in this industry for over 40 years in every facet from operation to distributing to factory. We love the people in it, all of them, and hope we represent all sides.

I was asked to attend the AMOA board of directors meeting and give a little talk about how important it is to solve any problems or disagreements we have. I felt my purpose was accomplished. Bev and I made another large number of friends, got an education, and healed some wounds. I guess Mom was right when she used to tell me, "People don't care how much you know until they know how much you care." And Bev and I do care about this industry very much. I am happy to be with a manufacturer that cares and allows us to care.

I've included some of my favorite photos from Washington gatherings and wanted to share them with PLAY METER's readers. ●

Bev and I with Congressman Toby Roth in his office. (Later that day he co-sponsored National Jukebox Week).



The AMOA executive committee, standing l to r: John Estridge, Wally Bohrer, and Dick Hawkins. Seated l to r: Dock Ringo, Al Marsh, and Wes Lawson.

My second best picture of the year—Bob Fay, Wally Bohrer, and me in Washington D.C.

My picture of the year—Bob Fay and Dick Hawkins in Washington, D.C.

Editor's Note: Bob and Bev received the following letter from Congressman Roth after the Washington Conference, clearly indicating the impact industry representatives can have at the highest political levels.

United States
House of Representatives

Dear Bob and Bev:

Thank you for taking the time to stop by my office during your recent visit to Washington, D.C. It was a pleasure to talk with you and spend some time at the reception.

I received your information in support of several bills presently before Congress. You'll be pleased to know that I have co-sponsored H.J. Res. 446 establishing the week of Oct. 30-Nov. 5, 1988 as National Jukebox Week. As you know, the jukebox is an integral part of our American heritage and culture and certainly worth commemorating.

I am also enclosing a souvenir of your recent trip to Washington. I trust that it will serve as a pleasant memento of your days in the nation's capital.

Thanks again for your visit. I will be sure to be back in touch as soon as plans for our annual Exports Conference are confirmed.

Sincerely,

Toby Roth
Member of Congress

Speak softly . . . . . and carry a big business card

by Bonnie Theard

Teddy Roosevelt is famous for the saying, "Speak softly and carry a big stick". Excuse me if I take this thought one step further by saying that soft speaking and a great business card are another effective combination. In our business, communicating to potential customers is crucial.

Usually, in crowded settings such as state and national shows and distributor open houses and meetings, attendees come away with a fistfull of cards and only a fading memory of the faces that accompanied them. Standard, run-of-the-mill cards just won't due in today's world.

Try for the adventurous business card and don't overlook the back of the card. Would you use only half of the available space in an ad promoting your company? Not if you want to tell your whole company story. Somewhere between clutter and too much blank space there is a happy medium.

There are three major categories of business cards: Traditional (dull), Flashy (overdone), and Distinctive (memorable). Shoot for Distinctive.

Don't be afraid to experiment. Steer away from the ordinary black type on white background card. Try a color background and use a company logo if you have one. If your business is games and music consider a mini jukebox (remember the 100th anniversary of the jukebox and all those radio stations that play just oldies but goodies), or a mini video cabinet. If your company specializes in, say, basketball games, put a mini-basketball or picture of your game on the card. You'll go a long way in being remembered well after an event, and the nagging question, "Who was that guy again?" It will be much easier to place you with an outstanding business card.

One spot commonly overlooked that contributes to the Distinctive category is the back of the card. It's a fine place for listing special services you and your company provide. Here you can answer common questions about business hours, specially-trained employees, length of time you have been in business, and a host of other informative tidbits that tell more about your operation. Enlarge on the communication ability of your business card this way. You may wish to put, at the bottom middle or bottom right hand side of the card the words, *please turn* or *over please*.

If you do not wish to have this information printed, you can have a stamp custom made with this data and stamp it on the back. Then you can use your cards with or without this additional information. You may also have a stamp made that lists a special offer good for a specific time and stamp that on the back of your card for a certain event.

Photo cards offer a new twist and feature a small picture of an individual. You won't be forgotten that way. Another innovation is the full color photograph card with white lettering. These are the most costly, of course, but your budget may be able to stand it, particularly during an anniversary year for your company or another special occasion. It's a real attention getter.

Nondescript, ordinary cards will probably be kept with a rubber band around them in the recipient's desk drawer for later reference. The Distinctive business card will be a conversation piece at the office and will spread your name much further than your first, original contact.

Check with your local printer for various types of paper stock for your card to be printed on. There are papers that resemble the look of leather, dull and

glossy finish papers, even clear plastic used for cards. You can make a subtle, sophisticated impression with an embossed card, or one with a cut-out design. Make your recipient take notice with a card printed vertically. Where is it written in stone that all business cards have to be the standard horizontal design?

and circulated to your customers. Bring these cards to shows and place them at your booth or carry a small pocket folder of them around with you. These are great and can be economically done in either standard uncoated paper, glossy coated paper, or hard plastic deluxe models. Present customers or potential ones will appreciate not having to write your name, number, and address in their rolodex, or perhaps even type it.

clerical staff not to use. It's a real time saver. My suggestion is to have these done in color so they stand out in the mass of whiteness around most offices. Go dramatic with a vivid color such as red with white writing reversed out of the darker color. Go for the classy look with gold or silver printing on a dark green or navy background. Bright yellow with black lettering is another good choice for standing out in a crowd.

Some other suggestions from the Kwik Kopy Printing chain include fold-over cards, chrome-coated cards with foil stamping, and round-cornered cards. Unusually shaped cards or those with a design on the edge require a die to be made first. Almost anything a customer requires can be accomplished, including a ghost image under the lettering. If your company has an unusual name, capitalize on it by using a small piece of artwork that relates to the name.

It's a good idea to put the phone number in large letters as it often appears very small and is hard to read. Always put your zip code and any after hours numbers. You may also want to put your home phone number to ensure your accessibility. Here's another suggestion that will prove helpful to your customers and beneficial to you. Definitely have index cards printed

Index cards spell out your name in the mass of rolodex entries and keeps your name forever up front with customers. Index cards quite literally jump out at you. Just looking at my rolodex right now I count five index cards sticking out from the regular ones, meaning I can't run through my listings without seeing those names daily. I often wonder why more companies don't take advantage of this communication tool. The ones I have in my possession are not just the big boys, mind you; they are from small companies and distributors, with only one exception.

Index cards can be mailed out with other material being sent to customers and will automatically be used. They are just too handy for the customer or his secretary or

It's difficult to distinguish companies and personnel when all the business cards look alike. It doesn't always follow that your business card will be put on a rolodex card or that the information will be transferred to one.

If you've had the same business card for eons, it's time to change and make your card communicate more. Make a good impression the first time out and have the card do more than one job. Your business card has to speak for you later when you're not around to explain the virtues of your product or service.

Editor's Note: We credit Richard T. Edwards of Moorestown, N.J., for contributing the idea of a business card article and for a portion of its content. ●

"Show attendees come away with a fistfull of cards and only a fading memory of the faces that accompanied them."

MASSACHUSETTS

Pinball doesn't lose its appeal, according to a recent article in The Boston Globe which offers quotes from industry representatives Art Palter of Woburn Vending in Woburn, Jim Farren of Fun & Games in Framingham, Steve Kordek of pinball manufacturer Williams Electronics, Anthony Grazio of Globe Automatic Vending in Quincy, and David Jackson of Action-Jackson Industries in Malden. Palter (a Play Meter guest writer for Technical Topics) praised the longevity of pinball, saying, "You can run a good pin for six or seven years, if you keep it up, keep it in good shape, keep the flippers strong. Once a good pin, always a good pin."

Pinball is a more social game than video, for example, and that contributes to its longer life on location. But all is not perfect for pinball; however, as it was noted that the games have added more bells and whistles to please a young audience reared on video, not always to the best effect. Pinball is equally appealing for men and women and often affords more time than video for the same quarter. Kordek explained that women and new players are kept in mind during game design, saying, "The way we do it is that in playing the ball on the ball field, the player is aiming for something, but if he doesn't get that, then he gets something he doesn't expect."

Although given a back seat during the video game fad of the early 80's, pinball is a steady revenue producer that has regained its popularity. Regarding that video fad, Farren commented that the drop in interest came as the result of an audience becoming familiar with computers. "It was like 1909 when the first car came out," he said. "People drove them around because they were a novelty. Now, people need cars." Farren feels that the strangeness has worn off and entertainment is now the main focus of players.

NEW JERSEY

Operators of redemption games in the state have been granted permission to raise both the price of game play and the value of prizes that can be won. New pricing ranges from five cents to $1.25 for each game. Players may save tickets from the games to gain large prizes valued up to a new limit of $999. Before, the top price per game play was 50 cents with top prizes limited to $500 in value.

The ruling came from John Vassallo, Jr., director of the N.J. division of Alcoholic Beverage Control and commissioner of the N.J. Bureau of Amusement Games and Control. A hearing had been requested by AMOA-N.J. on this matter. Popular seaside resorts like Wildwood, Asbury Park, Atlantic City, Seaside Park, Long Branch, and Seaside Heights are among those that account for healthy amusement revenues and they will now be able to offer even higher valued prizes for customers who enjoy the family fun and entertainment along the Jersey shore.

NEW YORK

Industry veteran Dan Morin of Capitol Automatic Music in Delmar was recently highlighted in a Capital District Business Review article focusing on jukeboxes. Morin was raised in the business from childhood when he accompanied his father on business calls. Morin was interviewed in Albany where he installed a Wurlitzer *One More Time* in the Plaza Grill on Broadway.

Morin made a good case for the amusement industry and explained the risks that face operators of coin-operated equipment; risks such as getting service calls at strange hours and purchasing equipment for new businesses that may or may not succeed. Morin advised that a good amusement business gives much thought to the proper mix of equipment including video and pinball that must be replaced soon, and long-lasting pieces like jukeboxes and pool tables. He explained that, "It is a business where you can make a good living, but it's not one to make you wealthy."

PENNSYLVANIA

Despite some apprehension on the part of businessmen and merchants in Phoenixville who had an unpleasant experience before with a poorly run game room, amusement center owner Victor Navon is renovating a building and opening a new arcade on Bridge St. this summer. The game room, called Player's Choice, will have 30-40 game machines including foosball, video, pinball, basketball, and air hockey. Navon said, "It will be a fun place." He assures that a supervisor will be on the premises at all times.

Lack of area enthusiasm comes from concern about crowds and kids being around all the time. Any past bad memories should be dispelled by Navon's solid, well-run business approach. He is investing a substantial amount to renovate the building and is an experienced manager with four other amusement centers in the region. Navon does not permit bad behavior in his establishments, indicating that such patrons are asked to leave. "We expect them to behave with respect," he stated. Rules will be posted in the game room and these include no smoking, eating, foul language, drugs, or abusing the equipment.

A positive attitude is expressed by borough officials and the police chief, all of whom indicate that the quality of management has a great deal to do with the quality of a game room.

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BullShooter III climaxes nine-month tour

Arachnid's BullShooter III World Challenge of Champions $35,000 dart finals drew 3,300 entries in eight events at the Ramada Hotel O'Hare in Chicago over Memorial Day weekend May 27-30. The finals climaxed a nine-month tour of ten $5,000 U.S. regionals and several foreign regionals.

This year's tour was $50,000 richer total, five regionals wider, and four events stronger than last year and there were over 1,000 more entrants at the finals.

Dart players from all over the world—Australia, Canada, Japan, West Germany, and the U.S.—competed on 130 English Mark Darts machines. Challenge matches between nations started the four-day event as Australia, Japan, and Team Arachnid USA, holders of the trophy, played for the Pacific Cup. All three teams played 701 at once in a race to five games. The Australian team of Russell Stewart, Tony Fleet, Trevor Vandeyck, Florence Collins, and Lorraine Doyle took the cup home.

The European Cup, fought for by the the U.S., France, and West Germany, was won by the BullShooter All-Stars team of K.C. Mullaney, Wayne Roewer, Jim Ratliff, and Mark Turner for the U.S. This marks the second year in a row that the All-Stars won this cup.

The Australian team performed well the entire weekend, taking seventh in Women's Doubles, ninth in Women's Singles, first in Mixed Doubles 701, first in Open Doubles, first in 501 Open Singles, and second in Pro Singles.

This last event brought an exciting match between Russell Stewart of Australia and Bob Honeycut of Indianapolis. Honeycut became the first champion of this new event, Pro Singles.

Larry Prewitt of Lynwood, Wash., placed third ahead of defending Open Singles champ Bruce Holmes. Tom Pace, 1986 Open Singles world champ, tied for fifth place with Australia's David Cook.

In Women's Doubles, Carol Johnson of Cary, Ill., and Colleen Washburn of Chicago won first place. They placed third at the Illinois state tournament and tied for seventh at last year's BullShooter.

In Open Doubles, defending champ Russell Stewart and partner David Cook of Australia were the winners. Tony Fleet and Florence Collins of Australia upset the Mixed Doubles 701 field by beating defending winners Terry Mutton of Peoria, Ill., and Carol Johnson of Cary, Ill.

Mixed Cricket, a new event, was won by Jim Nolan and Theresa Nerona of San Jose, Calif. They had won this event at the San Francisco regional. Theresa became the BullShooter's first Women's Singles champ. She also won Women's Singles in San Francisco.

The 501 Open Singles title was won by Trevor Vandeyck of Australia. The first Cricket championship was won by Russell Stewart of Australia.

Arachnid is already looking ahead to BullShooter IV in 1989

Bob Honeycut, first place winner in Pro Singles 301 Double In/Double Out, receives trophy from Arachnid's Bernie Powers.

Shirley Merlo of Arachnid presents award to Jeff Wiley, winner of five events in Dayton, Ohio.

and the tour of regional tournaments. The company expects a 30 percent greater turnout as enthusiasm builds for these events. For information on the next tour, call Arachnid (800) 435-8319; in Illinois (815) 654-0212.

Mideastern Qualifier

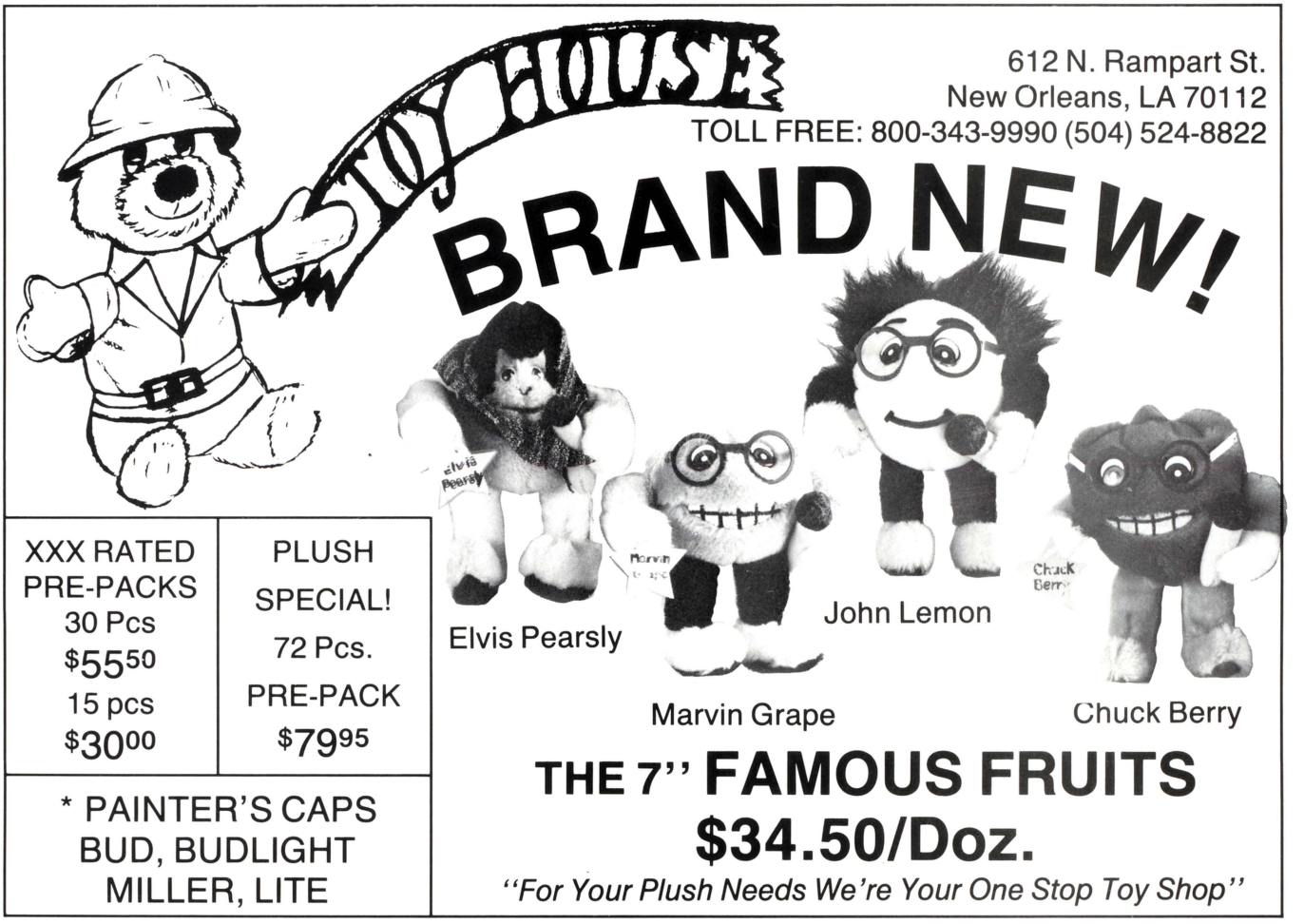
Dayton, Ohio, was the final stop on the BullShooter III regional tour before the finals and drew players from Ohio, Indiana, Wisconsin, Virginia, Pennsylvania, New Hampshire, and Maine.

The eight-event competition was held April 16-17 at the Teamsters Local Union #957. Gem Music & Vending was a co-sponsor along with distributor sponsors Shaffer Distributing and Cleveland Coin.

Jeff Wiley of Corydon, Ind., won first place in five events, including 301 Double-In/Double Out Pro Singles. He teamed with Charlie Coomer of New Albany, Ind., to win Open Doubles. Brenda Miller of Palmyra, Ind., teamed with Wiley for the Mixed Doubles events—Mixed Cricket and 701.

Ruth Merideth of Clarksville, Ind., and Barb Hall of New Albany won Women's Doubles. Hall went on to win Women's Singles.

Theresa Nerona became the first Women's Singles world champion at BullShooter III. Bernie Powers presents the trophy.



Machine-saving repairs and route collections

by Arthur Palter
Woburn Vending

Along with more ideas on keeping games running, I'm detailing a list of procedures we've developed to collect our route that we've found to be most productive.

Machine-saving repairs

Claw String, prevent breakage: The area where the string comes out of the claw cap is often a point where the string breaks. Betson has developed a metal sleeve that the string is threaded through, but if you get some 1/8-inch and 3/32-inch shrink sleeve you can protect this area very well.

First thread the end of the string through the hole in the coil cap. Then put on a 3/4-inch long piece of 1/8-inch shrink sleeve and move it up a bit on the string. Next, take a 1/2-inch long piece of 3/32-inch shrink sleeve and place it on the string. Make a double knot at the end of the string and slide the 3/32-inch piece up to the knot and heat it. Then slide the 1/8 inch sleeving over the smaller piece and over the leading edge of the knot. Heat this also, and then move the cap down to the knot, threading the protected string through, and screw the cap in place.

2. **Switches**: By now I hope everyone has replaced their Controls, Inc. all-in-one button switches with the micro switch type also made by that company. This makes the ''sticky button'' problem disappear! You can use the old switches you take out for start switches or other applications where constant tapping or firing is not needed. *Shinobi*, early *Double Dragons*, and *Street Fighter* all used this type of switch.

3. Most **High Speed** pins develop cracked ramps. Because the ramp is made of polyethylene type plastic, most epoxies won't stick to it. A product named Household Goop sold in many hardware and department stores, and some fiber glass patch cloth, will save the $100 or so the ramps cost to replace.

4. When the fly back on your **Star Wars** goes back and you have to replace the entire CRT, deflection board, etc., don't throw out the X Y color tube. Change the pin cap with one taken off another color raster scan CRT that is either badly burned-in or just N.G., and you will have at least salvaged some of the X Y color system and put it to good use replacing an otherwise badly burned CRT that you didn't want to put in your new conversion with its $1,400 Kit.

5. When checking for proper 5 VDC on Logic PCB's, the voltage drop through the edge connector should not exceed .2 volts. A fast way to find this is to put one lead on the +5 volt wire on the wire side of the connector. Put your other load near the far end of the board also on a +5 volt point. Your meter will read only the voltage drop. Using this method, you save the trouble of taking two different readings as with measuring the +5 volts on both sides of the edge connector. Be very careful not to short out any IC leads when doing this. Try to find capacitor leads as check points.

Collection procedures

Video Games

1. During every collection clean the main display, header plexi, and control panel. Also clean top and front of cabinet as needed.

2. About every two months, depending on the game and the amount of time the game remains powered up, clean the CRT and all viewing surfaces with anti-static spray cleaner.

3. Check coin rejecter operation for hard to push or sticky mechanisms.

4. Open game and check coin mechs for dirt and loose mounting screws.

5. Empty the cash pan and hold out coins to test all coin chutes. Lock the door and deposit test coins, checking for proper acceptance and credit.

6. It there are kick marks on the coin door, extra attention to testing should be made for all aspects of game operation.

7. Header light should work, if not, replace lamp and/or starter.

8. Keep cash bag in sight or secured at all times.

9. Look at back door and make sure it's secure.

10. Try to let the proper person at the location know you are there and inquire as to any problems. It never hurts to say hello.

11. Report any problems you can't take care of yourself to the shop A.S.A.P.

Pinball Machines

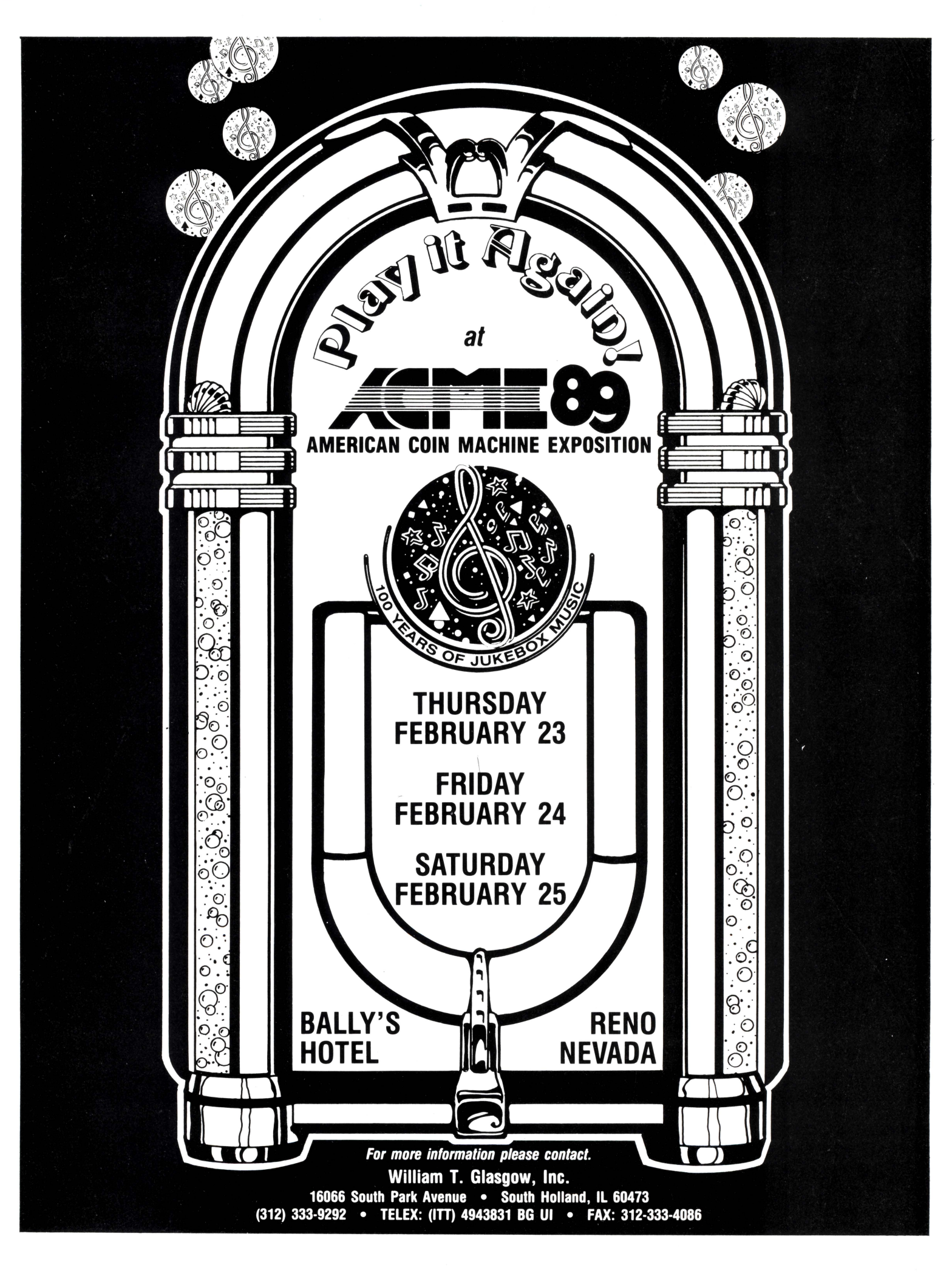
1. Collect using the same steps that apply to all games above.

2. Clean the playfield whenever ball tracks start to show up. While the glass is off, check for loose post, damaged rubbers, burned out lamps (every collection); turn flipper rubbers if necessary, but don't flip them over. Put the game into test modes to check the operation of all coils.

3. Take notice of replay percentages and reset high score.

4. Check for loose leg and head bolts.

5. Play the game and listen to the patrons tell you what a great job you have done.



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Mondo Bondo

by Randy Fromm

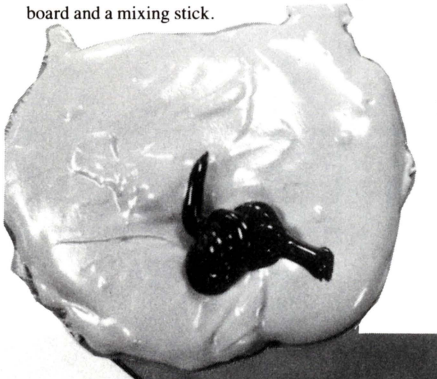
Video games take a lot of abuse as they are moved from location to location. Because the cabinets are made of particle board, the corners and edges can break quite easily. But I'm not telling you anything you don't already know, am I?

Some operators use everything from screws to hot glue in an attempt to re-affix a broken piece. Others simply leave the broken cabinet "as is" and operate a terrible looking piece of equipment. There is, however, a quick and easy way to repair broken cabinets.

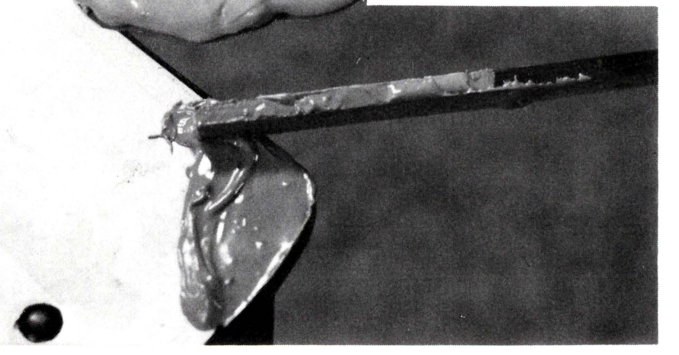
Plastic auto body repair patching material can be used to perform cabinet repairs that look as good as new in less than an hour. There are many different brand names of this material, but the most commonly found one is Bondo. Bondo is available at virtually any auto parts store.

There is very little that needs to be said about using Bondo. Just follow the directions on the can. The only tools you need are a wooden stick, a piece of cardboard, a rasp (to shape the patch after it has hardened), and some sand paper. The material hardens in just a few minutes and can be shaped and sanded within an hour. After the patch is painted, the broken cabinet will be "route ready".

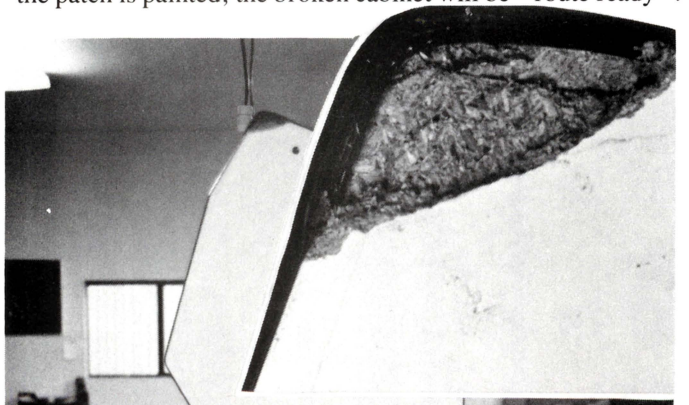
Bondo to the rescue! It's available at any auto parts store. All you need is a piece of cardboard and a mixing stick.

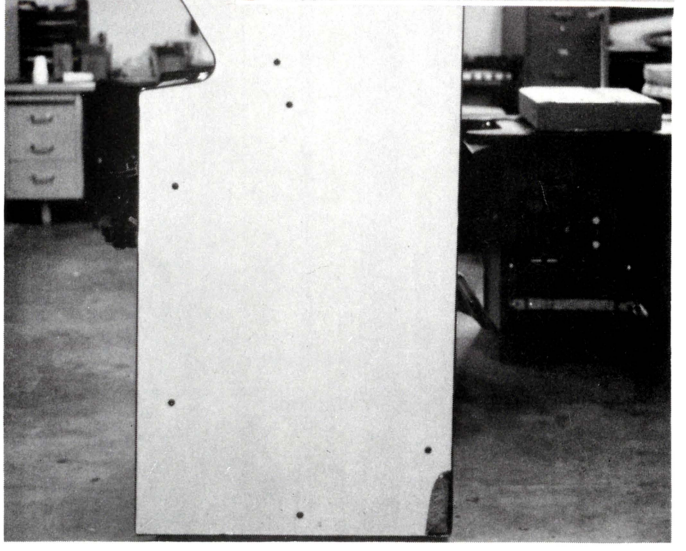


Follow the directions on the can for mixing the filler material and hardener. Using a little more hardener than called for will result in faster hardening and a quicker repair.

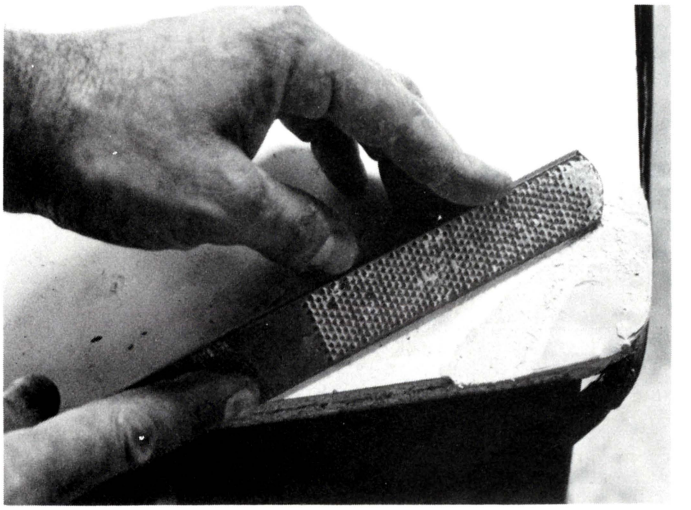


Lay the game on its side and apply the Bondo. Work fast! It hardens in just a few minutes!





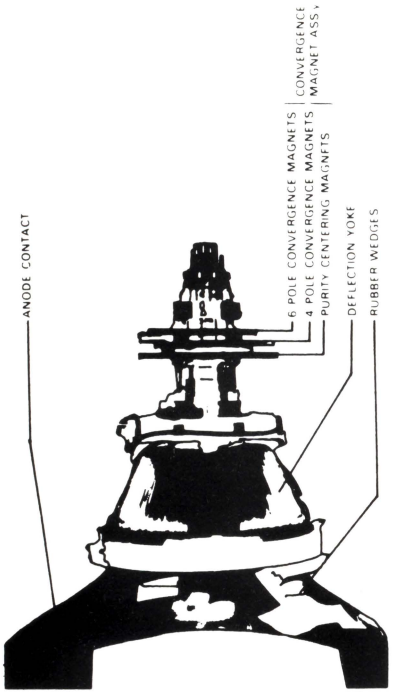
Yuck! Broken corners make a video game cabinet look terrible.

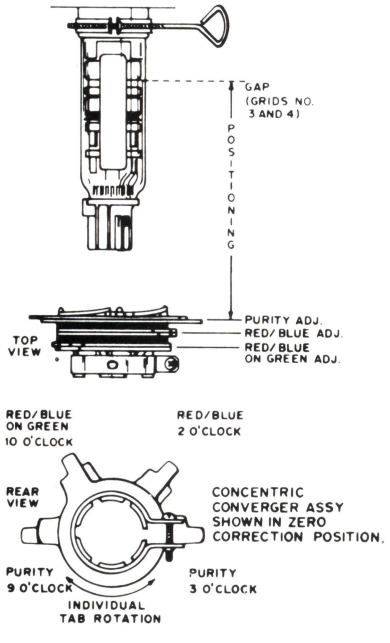


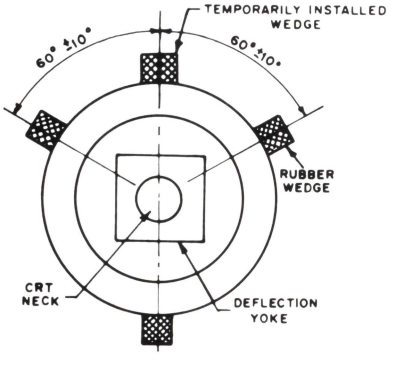
After hardening, use a rasp to level the Bondo patch. Sand as necessary to obtain a smooth surface.

REPLACING PICTURE TUBES

by Randy Fromm
and
Darrell Burton
(of Wells-Gardner Electronics Corporation)







Editor's Note: We asked our technical expert, Randy Fromm, if he would write an article on what operators need most from a technical standpoint. He advised me that he had done two such articles several years ago and the information was still as good as it was then. In that case, we decided to reprint those two articles, Replacing Picture Tubes and Inexpensive and Easy to Use, This is...the Digital Multimeter.

The picture tube or CRT in a video game monitor might have to be replaced for a number of reasons. Careless handling can easily break the neck. The phosphor coating on the inside of the screen can become "burned in" with the image of the game, or the picture tube's electron gun assembly might fail.

Replacing a picture tube is a relatively simple task. With practice and just a little luck, CRT replacement can be performed quickly and easily.

Start by discharging the second anode. The second anode is the high voltage connection of the CRT and can be discharged by inserting a grounded screwdriver under the "suction cup" of the second anode connector. Remove the connector from the picture tube.

Unplug the yoke and degaussing coil connectors from the monitor printed circuit board, and remove the "neck board" from the end of the CRT. If you find a CRT ground wire connected to the neck board, disconnect it as well. The CRT ground is connected to a wire strap or spring that is stretched across the outside of the picture tube.

Unbolt and remove the CRT from the chassis. The yoke and degaussing coil will still be attached. Also mounted on the neck of the picture tube is the purity and convergence ring assembly.

Loosen the clamps that secure the ring assembly and yoke to the neck of the CRT and slide them both off. Remove the rubber wedges that are glued to the CRT. You may also see some cardboard strips glued to the picture tube. Try to remove them without too much damage. You will use them later to help reconverge the monitor.

Remove the degaussing coil and transfer it to the new CRT. Some of the older monitors will also have a metal shield surrounding the picture tube, but today's picture tubes are internally shielded and do not require an external shield. Slide the yoke and ring assembly over the neck of the CRT, and rebolt the picture tube to the chassis of the monitor. Alternatively, the yoke and ring assembly can be removed before and replaced after the picture tube has been exchanged. Just put the whole thing back together the way you found it. Do not replace the rubber wedges or tighten the yoke or ring clamps at this time.

Reconnect the second anode, mount the neck board on the end of the CRT and reconnect the CRT ground to the neck board. Reconnect the degaussing coil and yoke at this time as well. Finally, connect the 120 volt AC input.

The monitors in video games must be powered by an isolation transformer; they cannot be connected directly to the AC power. If the monitor is to be powered independently of the game (e.g., on a workbench), an isolation transformer must be used. An isolation transformer is a safety transformer that magnetically isolates the chassis of the monitor to prevent it from becoming connected to the "hot" side of the AC power line.

Purity

That's about it as far as the actual CRT replacement procedure is concerned. But

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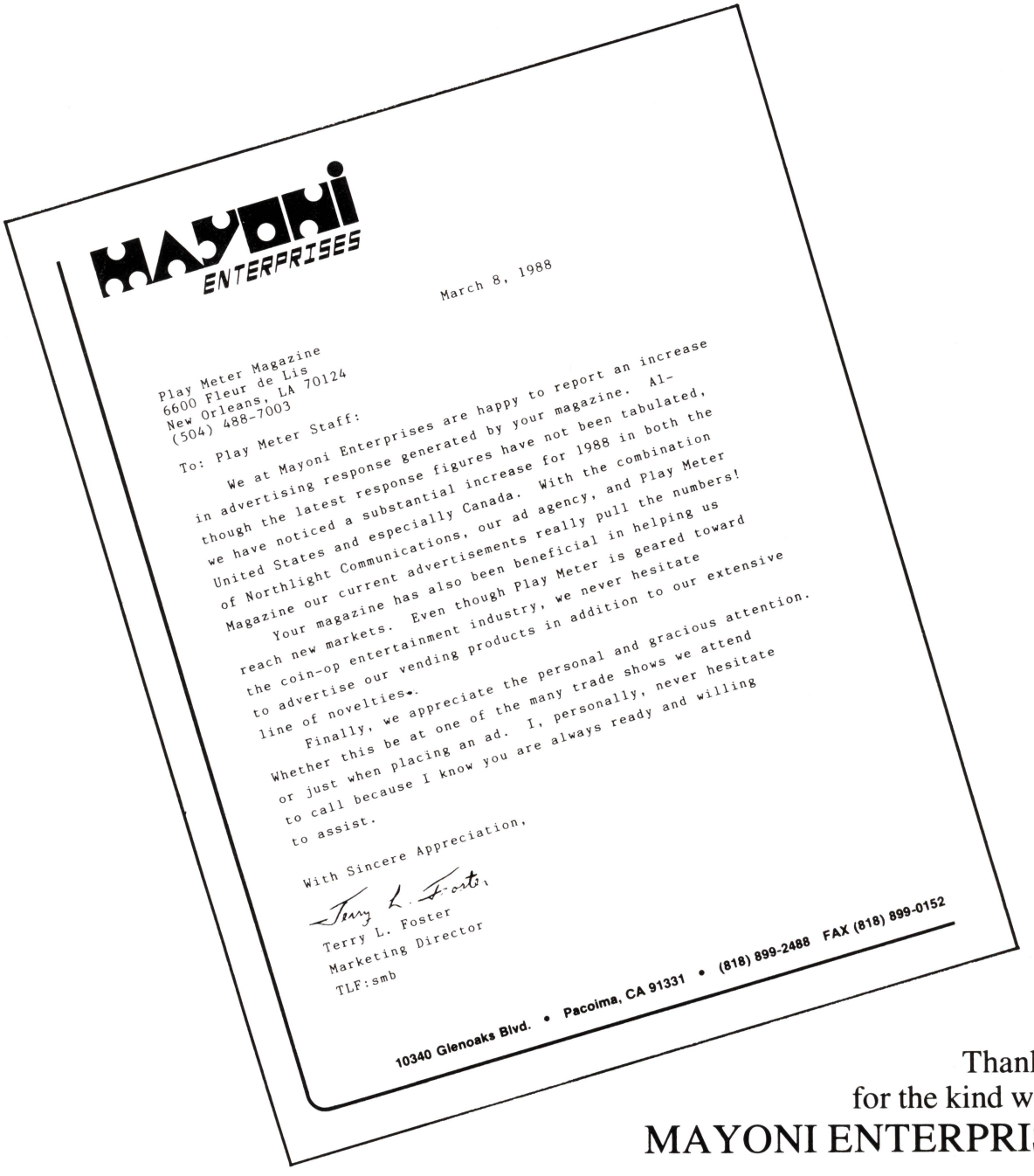
advertise: to make known: announce publicly: to call public attention to, especially by emphasizing desirable qualities so as to arouse a desire to buy.



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the monitor isn't quite ready for action yet! For the picture tube to function properly, each of the three electron guns in the neck must be precisely aligned so that its electron beam strikes only one of the three colors of phosphor stripes that coat the inside of the screen: red, green, or blue. Red, green, and blue are the three primary colors of light.

Unfortunately, picture tubes cannot be manufactured with the precision that is necessary for such perfect alignment. This is where the ring assembly comes in. The movable rings are slightly magnetic and are used to correct the paths of the electron beams so that electrons from the "green gun" strike only the green colored phosphor, those from the "red gun" strike only the red, and so on. This is known as setting up the "purity" of the picture tube.

Degaussing

Degaussing is necessary to eliminate the effects of the earth's magnetic field on the CRT shadow mark, assembly, and the magnetic shield. The CRT should always be degaussed with a strong degaussing coil with the monitor turned off whenever it is moved from one location to another. Always degauss the CRT in the position it will be operated.

For example, the degaussing and purity setup may be done on a workbench and, then, when installed in a game, you find the purity is poor and degaussing will not correct the problem. The reason for this condition is that the CRT is at a 60 degree angle from the workbench position. At this angle, the magnetic fields are acting on the CRT components at different angles and strengths which change beam landing, purity, and convergence. When this condition exists, the purity rings must be readjusted.

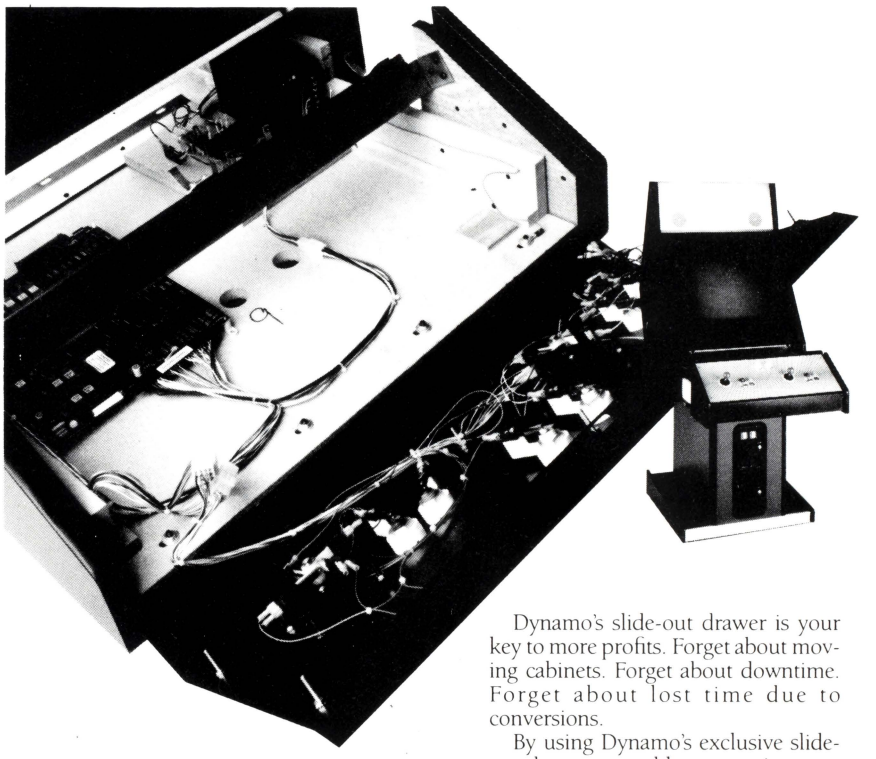
Now we may also be faced with redoing the complete CRT setup including reconvergence. Poor degaussing can also adversely effect the ability to achieve proper convergence. When you must set up a CRT for purity and convergence, as in the case of a replacement, be sure you have a good strong degaussing coil, a signal generator with the cross-hatch/dot pattern, purity functions, and required video and sync polarities.

To set purity, first push the yoke loosely against the tube funnel and tighten the yoke clamp for a slight holding grip. Next, position the purity rings of the convergence/purity magnet assembly, over the G3-G4 gap of the CRT gun assembly as shown.

Next, adjust the purity and convergence rings to the positions as shown below when looking from the neck of the tube toward the yoke.

Small positioning errors of the purity magnets relative to the G3-G4 gap will not degrade or seriously affect the capability of these components to produce good purity. With all connections from CRT to monitor made, position the monitor in its final operating position. Degauss the CRT with the external degaussing coil.

Turn the monitor on and allow the CRT to warm up for at least 15 minutes. With the generator connected to the monitor, set purity function to green raster. Adjust the red and blue cut-off controls fully CCW,



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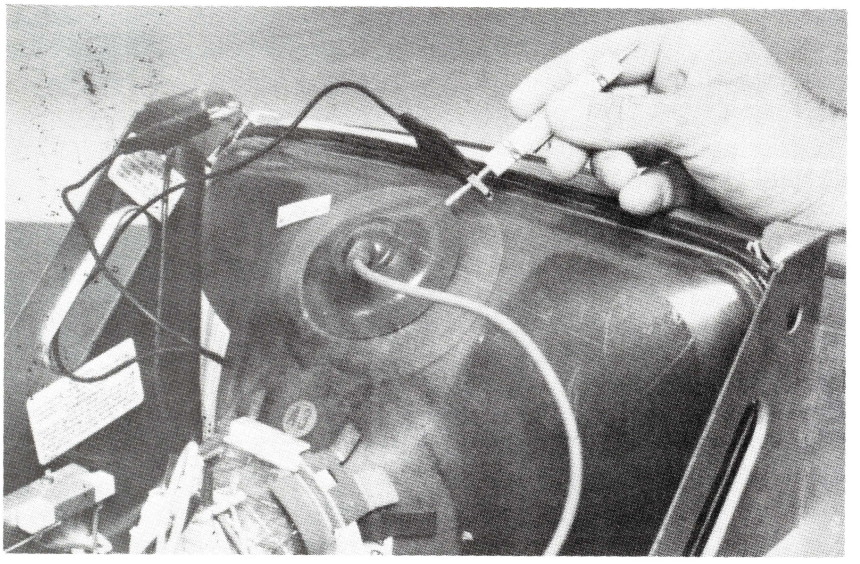
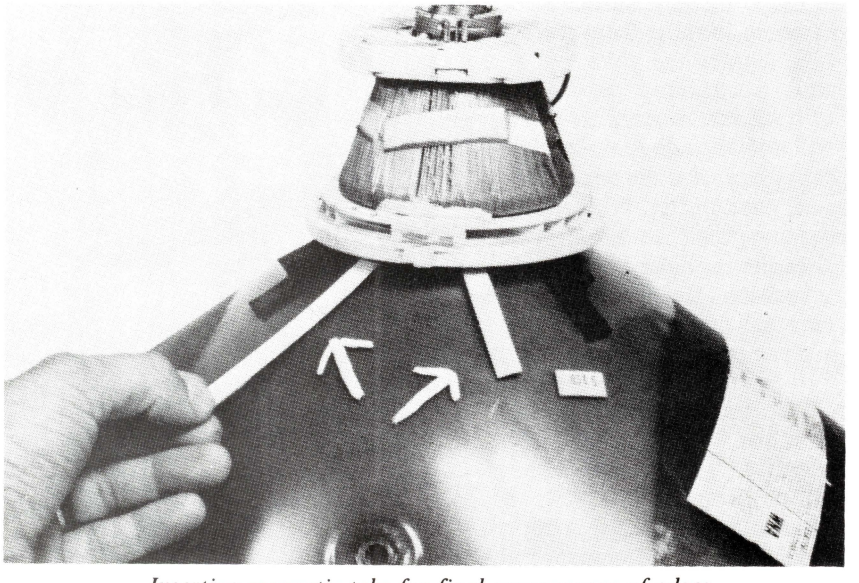
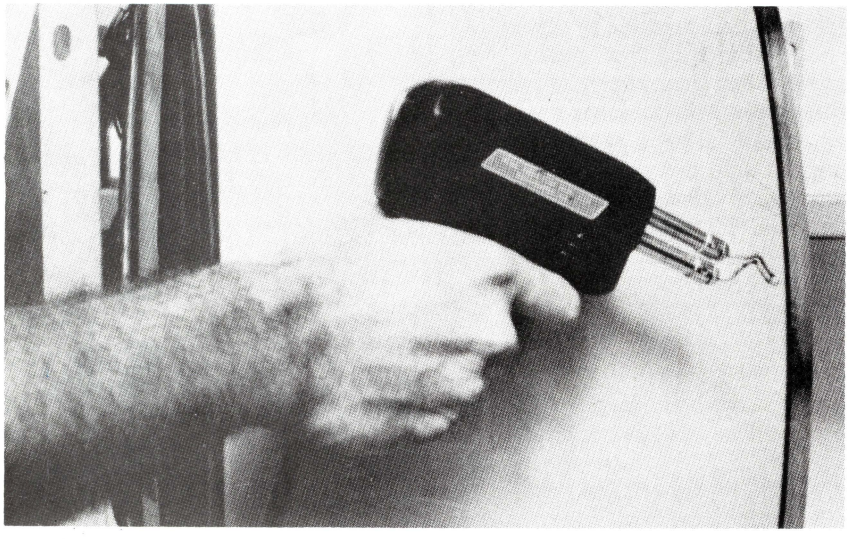


Discharging CRT.



Inserting magnetic tabs for final convergence of edges.



Picture tube can be degaussed with a soldering gun.
Turn the gun on and move it in circles around the front and sides of the CRT.

or to raster cut-off, and the green cut-off to a reasonably lit CRT screen. Pull the yoke back toward the purity rings until the green belt has appeared.

Now, center the green belt horizontally as much as possible by separating and rotating the two purity ring magnets. Then push the yoke forward gradually until the raster is uniformly green. Then insert a wedge just far enough to hold the yoke in a centered position and tighten the yoke clamp. On a good CRT, the proper purity appearance should occur when the yoke has been moved away from the funnel a distance of approximately 1/8-inch minimum to 9/32-inch maximum.

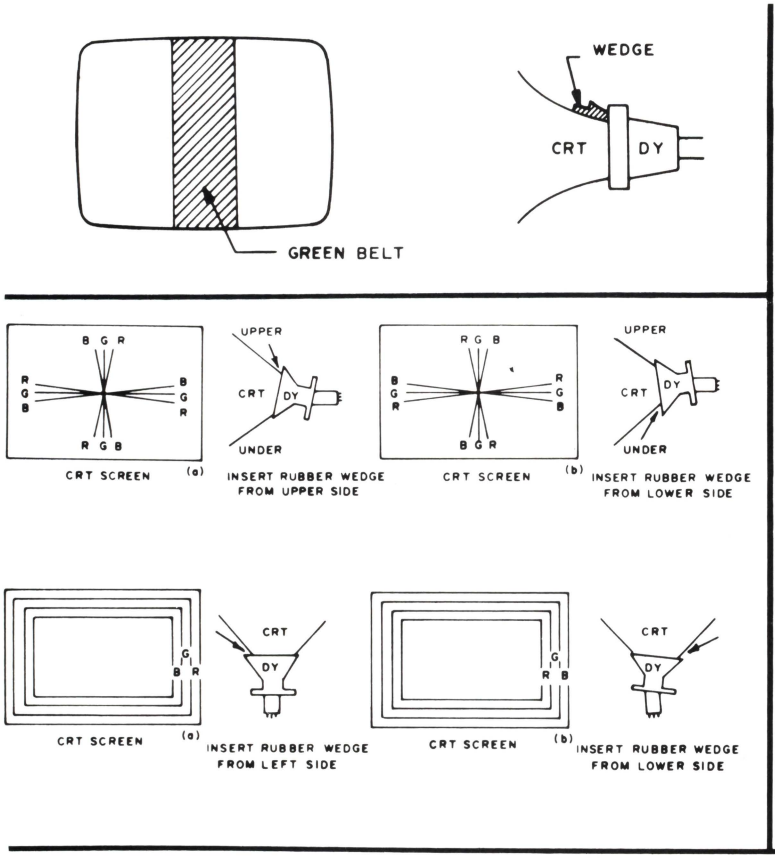
Next, check the red and blue raster for color purity by adjusting the red or blue cut-off control for a reasonably lit raster. Always turn the cut-off controls CCW, on off, for the unused screen colors to prevent color contamination. Positioning the yoke on the CRT neck for purity is known as finding the color center of the tube. This is the point where the influence of the yoke's magnetic field on the electron beam is correct, allowing the beams from all three guns to speed through the slots in the shadow mask and strike only their own color phosphor in all areas of the CRT screen.

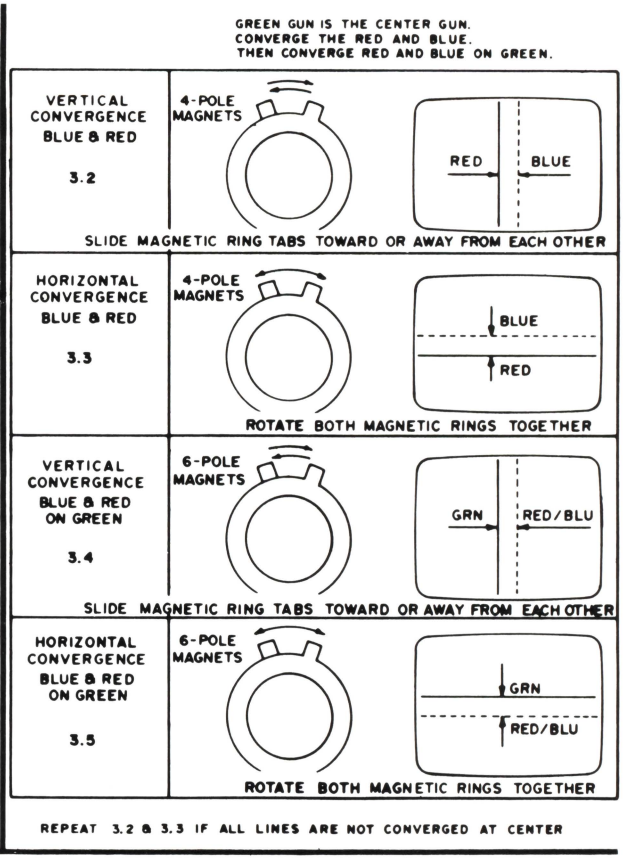
Due to production tolerances in these components, you may find a slight impurity in one or two fields after achieving purity in the green raster. If slight repositioning of the yoke, either forward or backward does not achieve the desired purity in all three fields, then a slight readjustment of the purity rings should produce the desired results. The purity rings provide the additional magnetic field to cover the small deficiency in the CRT-yoke tolerances.

Now you can set up the CRT cathode to GRID #1 cut-off voltage, commonly called Black Level, G2 or screen cut-off and tracking at the correct color temperature.

Then turn on the signal generator for the cross-hatch/dot pattern. Reduce the vertical size until the top and bottom of the pattern are just visible. Rotate the yoke until the pattern is straight horizontally and tighten the yoke clamp.

Now you are ready to proceed with the convergence procedure.





Convergence

Now that all the electron guns are hitting the right colors, you should be able to install the monitor in the game, right? Well, not quite! The multicolored displays of a video game are created by various combinations of the primary colors. When the red and blue phosphors are illuminated side by side, we see the color magenta. Blue and green combine to produce a color known as cyan (a kind of a light, blue-green color), and a mixture of red and green is seen as yellow.

So to produce the yellow image of Pac-Man, for example, the CRT must display a red Pac-Man in exactly the same position as it displays a green image of Pac-Man. When the two are seen simultaneously, you perceive it as a single yellow image. The purity adjustment does not actually assure that the electron beam will hit the proper area of the screen, just the correct color. Final aiming of the electron guns is known as "convergence".

Your convergence efforts will be directed into two areas defined as static, center area of CRT screen, and dynamic, which is all areas outside the center area to

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the edges and corners of the CRT screen.

A rule of thumb in the static convergence is achieved with the four and six pole magnet rings while the dynamic convergence is achieved by yoke adjustment and tabbing.

Always start with the static (center) convergence. The four-pole magnets control the horizontal and vertical red/blue lines. The six-poll magnets control the horizontal and vertical positioning of the red/blue lines relative to the green line.

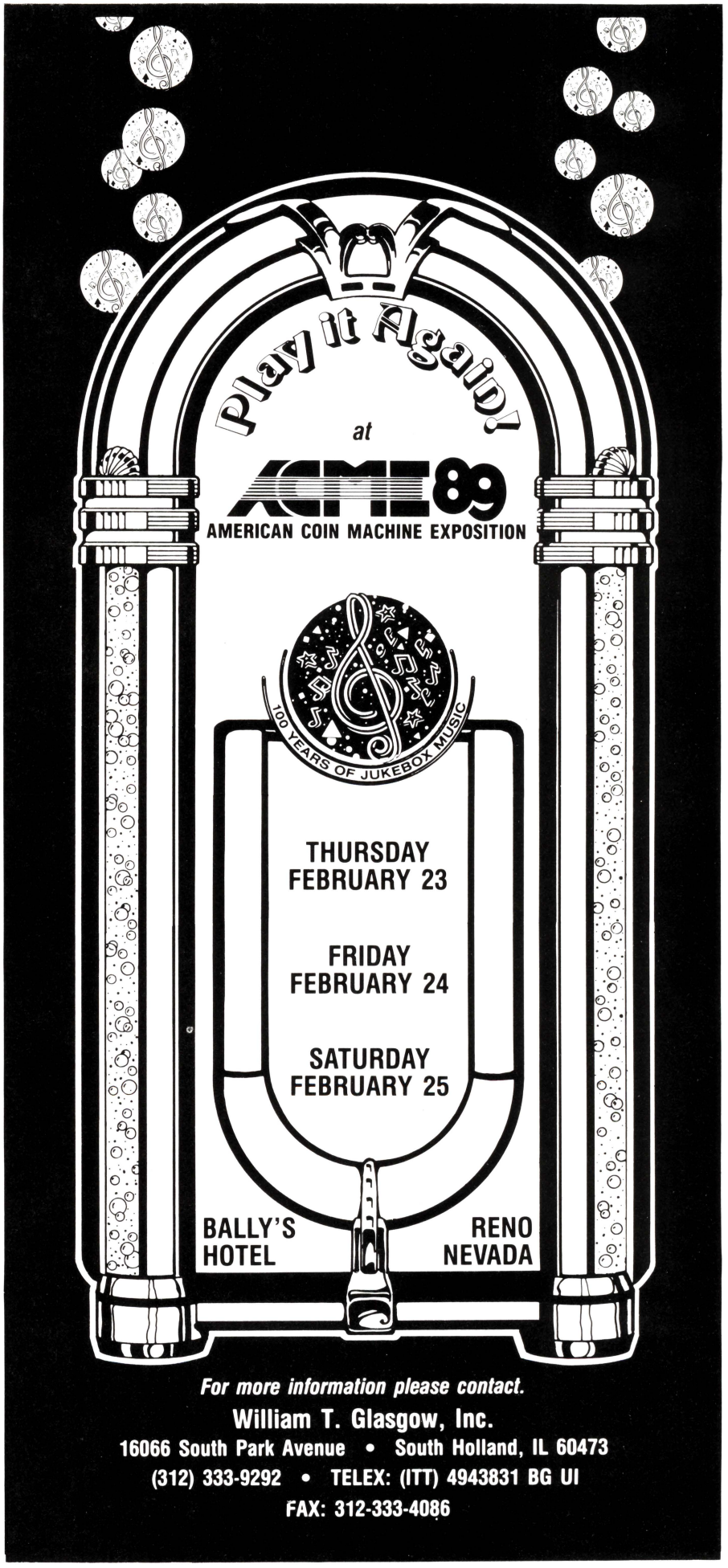
After achieving center convergence, look at the outer edges of the pattern and at all four corners to determine the major misconvergence areas. Observing the major misconvergence areas, move the yoke back and forth horizontally and then vertically. Note the correction possible and hold the yoke in the position for the best convergence compromise.

While holding the yoke in position, put the yoke wedges into position and tighten the yoke clamp tightly. This holds the yoke firmly in position and retains convergence.

Remember the cardboard strips that were removed from the old picture tube? Well, now's the time to use them because after about 15 minutes to a half hour of rocking the yoke back and forth in every possible position, you will probably find that the edges of the screen are still out of convergence in some places. Taped to the end of each cardboard strip is a small piece of metal. The metal end of the strip can be inserted between the yoke and the picture tube to subtly alter the magnetic field of the yoke.

This allows you to converge a small area at the edge of the screen without affecting the convergence at other areas of the display. Just experiment with them until you get it right in all areas of the screen. These "magnetic shims" can really be a lifesaver! You can make your own if you need to. They're made from ordinary sheet metal. Any metal that is attractive to a magnet will work.

Following these procedures and with practice, achieving the best purity and convergence possible with the production components should be easier, and the results will meet the requirements of the product.



Fromm conducts monitor repair school

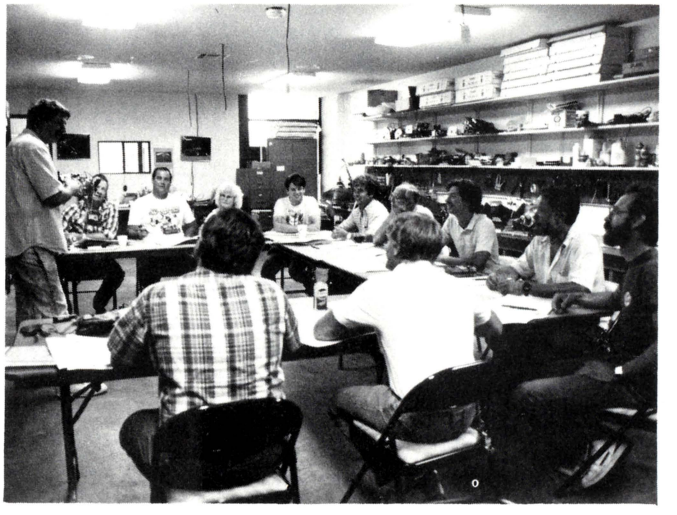
Operators from as far away as Las Vegas, Nev., attended a monitor repair school conducted June 4-5 in California by technical instructor Randy Fromm.

Noted Fromm, "a desperate need for operators to learn about monitors in as little time as possible" motivated the sponsorship of the repair school. The two day class was held at the offices of Area Amusement in San Marcos, about 30 miles north of San Diego. "With the advent of the conversion kit as a major component of most operator's routes, monitors are required to work longer than they ever have before," explained Fromm. "As a result, they are failing more often. This class was designed to teach people how to repair monitors without having to take time away from their weekly work."

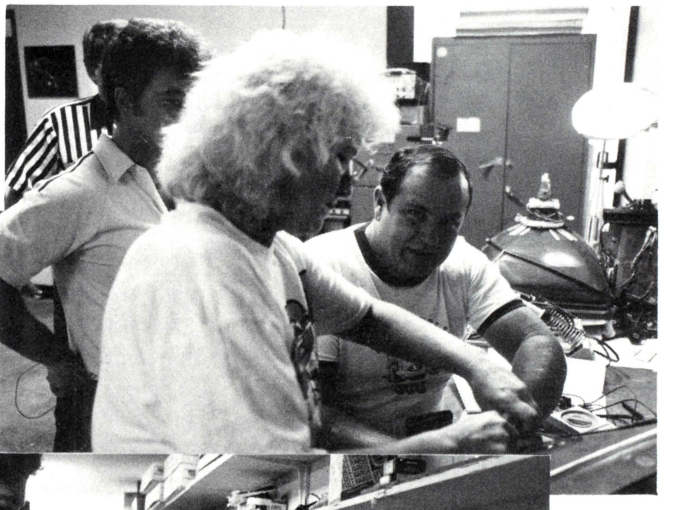
Operators attending the class learned to repair monitors with a mixture of classroom lecture and "hands-on" lab work where they had a chance to work on actual faults in a variety of different types of monitors.

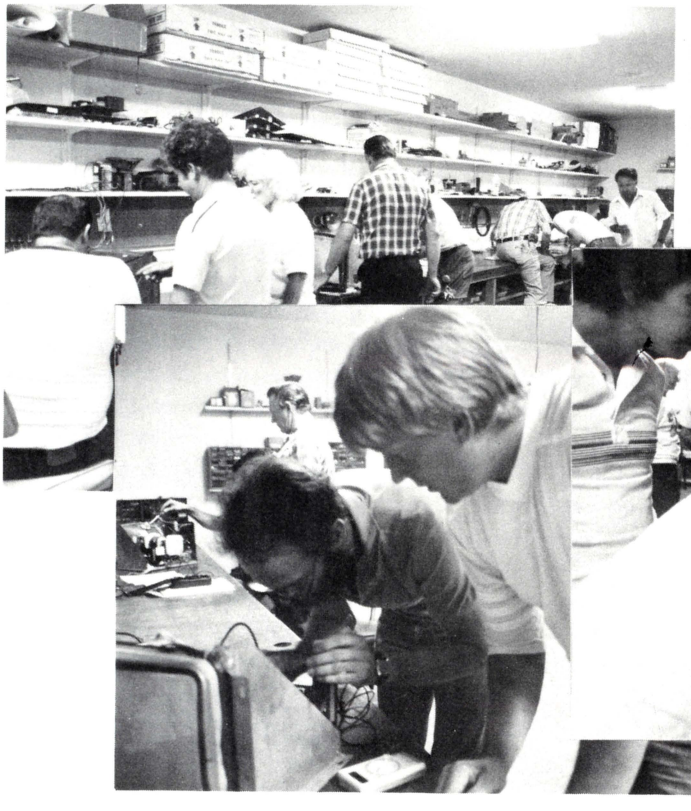
"In two days I learned not only monitor repair theory and how to read schematics, but had actual practice as well," said Joyce Castillo of Quality Video in Los Angeles, who attended the class along with co-worker Ed Sheehan.

Additional classes are planned in the San Diego area. For more information about attending a monitor repair class, or sponsoring one in your area, contact Randy Fromm, 7960 Culowee St., La Mesa CA 92041; (619) 697-4035.



Randy Fromm, standing, talks to operators, clockwise around the table: Charles Godwin, Ed Sheehan, Joyce Castillo, Brett Herst, Lee Cherry, Ted Schimer, Mark Rizzo, Charles Hegarty, Steve Brefka, Marc Farley, and Jack Bourus.





"Hands-on" lab work was a definite plus for operators.

Inexpensive and easy to use, this is... the digital multimeter

by Randy Fromm

There are many types of test equipment used to help today's operator keep his equipment up and running. Oscilloscopes, signature analyzers, logic probes, and logic comparitors are all employed in the war against downtime!

Some manufacturers and distributors of this type of equipment will tout their product as the be-all and end-all to successful game repair. While the abilities of these units cannot be disputed, they can't hold a candle to the varied uses and efficiency of the digital multimeter for the daily routine of electronic game repair.

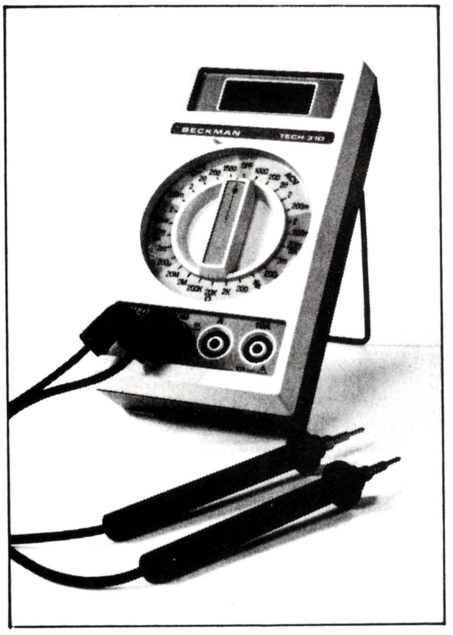
What's a digital multimeter?

A multimeter can be used for the majority of the various test and measurements performed while repairing electronic games. Voltage, current, and resistance can all be measured by the same unit, hence the name "multimeter."

There are two general types of multimeters: analog and digital. The analog meter uses a thin "needle." Its position against a calibrated scale on the face of the meter indicates the value or reading of the measurement performed. The analog multimeter's display is like the hands of a clock where the position of the hands indicates the time.

Measurements performed with the digital multimeter, however, can be read directly from a numeric display just as you would read the time on a digital watch.

One of the advantages of the digital multimeter over the analog meter is accuracy. Although each of the two types of multimeters may have the same specifications (say, .25 percent or .1 percent accurate), reading the analog display can produce some error when the needle falls between two calibrated marks on the face of the meter. The digital display, on the other hand, will always show an exact



reading regardless of the value.

A person reading a traditional watch might indicate the time prior to noon as "just about 12" or "a few minutes to 12." The wearer of a digital watch will be unquestionably specific with "11:57." An analog measurement of "around 5 volts" becomes "5.1 volts" with the digital multimeter.

Why use a meter?

Before the introduction of video games and electronic pinball machines, just about any problem in a game could be easily identified by examining the relays and stepping units. Burned coils, bad switch contacts, or other mechanical malfunctions could be spotted easily by the mechanic.

If the cause of the problem was not immediately apparent, a simple "clip lead" or "jumper" could ferret out the failure, bypassing any suspect switches or circuits. If the circuit then functioned properly, the bypassed circuits were identified as the problem and were, of course, repaired.

But the switch to solid-state technology ended all that. For in today's games, the mechanical relays and steppers have been replaced with electronic components such as transistors and integrated circuits. Electronic components don't move as they operate to control the flow of electric current in a circuit, and they don't generally look any different when they fail. This pretty much eliminates the chances of troubleshooting a component failure through visual inspection.

The somewhat more complex operation of most electronic circuits greatly limits the use of the jumper as well. (Although Bally has made extraordinarily clever and efficient use of the jumper as a troubleshooting tool for its electronic pinball system.)

Enter the digital multimeter! When repairing electronic circuits, the meter becomes the technician's eyes allowing him to see the invisible world of electricity. By using the multimeter, he can measure the pressure exerted by the electrons themselves as they pass through a wire or component.

This pressure is known as voltage, and although billions and billions of electrons race through the circuit in a game, the number of electrons flowing past any given point can also be measured with the meter. This flow of electrons through a wire or circuit is known as current. Measurements such as these are often the key to troubleshooting and cannot be performed without help from the meter or a similar piece of test equipment.

The digital multimeter can also be used to test components. Since examining a part to determine if it's good or bad is not generally possible, the meter is used to identify defective components instead. Just about all of the parts that are commonly found in games can be tested with the

meter. This eliminates the need for purchasing a separate piece of test equipment such as a transistor tester.

Various types offered

There are many different types of digital multimeters. All will operate in much the same manner. The basic differences lie in the type of display, the layout, type of controls, and perhaps some special features.

Digital multimeters are available with readouts made from light emitting diodes (LEDs) or liquid crystal displays (LCDs). The LED meters are generally powered by the 117-volts AC or are fitted with rechargeable batteries. The LED display requires a substantially large amount of power to operate and quickly drains the batteries. The LCD uses a tiny fraction of the power required by the LED display. While a meter that uses a LED display might need recharging after a dozen hours of use, a typical LCD multimeter will require a new battery after 200 hours or more.

One popular type of digital multimeter will operate for more than 2,000 hours on a single, 9 volt "transistor radio" battery! This long battery life makes rechargeable batteries impractical and unnecessary. When the battery runs down (a warning indicator will signal a low battery condition when about 10 percent of the battery's life remains), it is discarded and replaced.

Of course, alkaline cells are recommended for the longer operating time they provide. Needless to say, a meter with an LCD readout is highly recommended for working in the field.

Since the multimeter has many different functions, there are one or more controls used to set the meter for the type of measurement desired. Some meters use push-buttons, and some use rotary switches to select the function. Both systems work well. The novice will find a meter with a single, rotary selector is the easiest to work with. The push-button type is by no means difficult to master, however.

Other differences between types of digital multimeters include the ranges (minimum and maximum measurements that can be performed), overload protection, and special features such as an audible continuity indicator (beeps to indicate continuity so the technician doesn't have to look at the display), or a semiconductor test function. There are other special features available as well. Some even include a built-in logic probe!

Using the meter

Because of the variety of digital multimeters that are available, the operating procedures described are for one of the most popular types: the Beckman Instruments model Tech 310. This same meter is also available as the model 3010. The two model numbers were established in order to satisfy the two classes of Beckman distributors.

Commercial distributors (over-the-counter retail sales) will carry the Tech 310. Industrial distributors (O.E.M. suppliers) handle the 3010. The two meters are identical with the exception of the model number and the color of the case.

As mentioned earlier, all digital multimeters operate in much the same way. If the meter being used is not a Beckman, some of the display indications may differ. However, the test procedures

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will be the same regardless of the type of meter used. Consult the operating manual for your meter if there are any questions about the proper reading.

If the meter is to be of any use at all, it has to be connected to the circuit or device to be tested. There are two test leads for the meter. One is colored red and the other is black. While the connection of each of the leads is totally arbitrary for some tests, lead placement is critical for others so it's important to install the meter lead correctly.

The black lead is connected to the meter jack marked "COM." This stands for "common." The black meter lead will always be connected to the common jack. As a reminder, there is a black ring surrounding this jack.

The red lead may be connected to any of three meter jacks. There is a jack on the meter marked "A" for "amperes" and another marked "10A" meaning "10 amperes." The ampere (or "amp" for short) is the unit of measurement for electric current. The red meter lead will be connected to either of these two jacks if the meter is to be used for measuring current.

However, current measurements are rarely performed when troubleshooting. In fact, the methods for measuring current will not be discussed because there is virtually no reason to measure current while working on games. If the subject of current measurement is of interest, consult the operating manual of the meter.

Measurements of voltage and resistance are where the digital multimeter is utilized most often. For these tests, the red meter lead is inserted into the jack marked V-omega. The Greek letter "omega" is used in electronics to denote resistance. The V-omega jack is marked with a red ring to indicate that this is the proper place to install the red meter lead.

Voltage tests

Just as an air-conditioning mechanic might troubleshoot a problem by measuring the pressure of the coolant in a system, pressure measurements are used in electronic repair as well. In a system that contains liquid or gas, the unit of pressure is PSI (pounds per square inch); the pressure in an electronic system is measured in volts. For example, a 6-volt battery provides only half the pressure of a 12-volt battery, and a 12-volt battery provides only about 1/10 of that provided by the 117 volts that come from the electrical outlet in the wall or floor.

There are two types of voltage measurements that can be performed with the meter. One is to measure the voltage of "direct current" or DC. The other is to measure the voltage of "alternating current" or AC. Direct current flows in just one direction through an electronic circuit.

A battery is one source of direct current. Most of the circuits in a game use DC for power, and you will generally perform more DC voltage tests than AC tests.

Alternating current (such as that obtained from a 117-volt power outlet) doesn't flow in just one direction as does direct current. After flowing in one direction for 1/120th of a second, alternating current changes direction and moves the opposite

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way for another 1/120th of a second before switching back again.

To measure the voltage of alternating current, the meter's selector must be set to "ACV" or "AC voltage." Likewise, DC voltage is measured with the meter set to "DCV." When testing AC voltage, the meter can measure from as little as 100 millionth of a volt to 1,000 volts. DC measurements also start as low as those of AC but extend to 1,500 volts.

Each setting of the meter's selector is marked with the maximum voltage that can be displayed. For example, when the selector is set to "1500 VDC," the meter will display any measured voltage up to 1,500 volts. With the selector set to 200 VDC, voltage up to 200 volts will be displayed. Selecting 20 VDC allows up to 20 volts to be measured.

The proper setting of the meter is that which is as low as possible without being so low that the voltage measured is higher than the setting of the selector knob. For example, a 6-volt battery could not be tested with the meter set to the 2 VDC range. Six volts, of course, is higher than two volts. By placing the meter's range selector at the 20 VDC setting however, the voltage of the 6-volt battery can be easily measured. The battery's voltage could also be measured with the meter set to a higher setting (such as 200 VDC), but the reading would not be quite as accurate.

Set the meter as low as possible without being too low. If the measured voltage does exceed the setting of the selector, the meter will display "OL." OL stands for "overload", meaning the input voltage to the meter is higher than the setting. The meter will no be damaged, however.

The protection circuits in the digital multimeter will allow up to 1,500 volts DC to be applied to the meter regardless of the setting of the selector. The OL display indicates that the meter selector must be moved to a higher range in order to obtain a proper reading.

The lowest setting for both AC and DC voltage measurements is marked "200m." This stands for 200 millivolts. One millivolt equals 1/1,000th of a volt. When set to the 200m range, the meter can measure from as little as 100 millionth of a volt up to 200 thousandths of a volt.

Testing batteries

Testing a battery's voltage is easy. Set the meter's selector to DCV. The range setting will vary with the voltage of the battery under test. A 1 1/2-volt cell should be tested with the meter set to the 2 VDC range, a 6-volt battery requires a setting of 20 VDC, and so on. Place the red meter lead on the + terminal of the battery and the black lead on the terminal marked -. The voltage of the battery can be read directly from the display. A drop of 15-20 percent below normal indicated the battery is weak and should be replaced or recharged.

If the meter leads are accidentally reversed (red to—and black to +), the meter will still read the same voltage. But the meter display will be preceded by a minus sign. Incorrect placement of the leads will not damage the meter, but it does cause the display to indicate that negative voltage is measured.

Since it is important to know if a measured voltage is positive or negative,

THE MORE
THEY PLAY,

THE BETTER
THEY GET

it is likewise important that the meter leads be properly connected. When taking measurements of DC voltage, the black meter lead should be connected to the common zero volt reference point in the game. This common reference connection is called "ground," and all of the DC voltages are measured by grounding the black lead and using the read lead to probe various test points. The meter then compares the voltage at the red meter lead to the ground (which is always 0 volts) and displays the correct voltage and polarity.

Many manufacturers install one or more ground test points in the game. This makes it easy to locate the ground connection for the black lead. If there is more than one test point for ground, use the one that is closest to the point at which the red lead is connected. This will insure the most accurate reading possible.

Power supplies

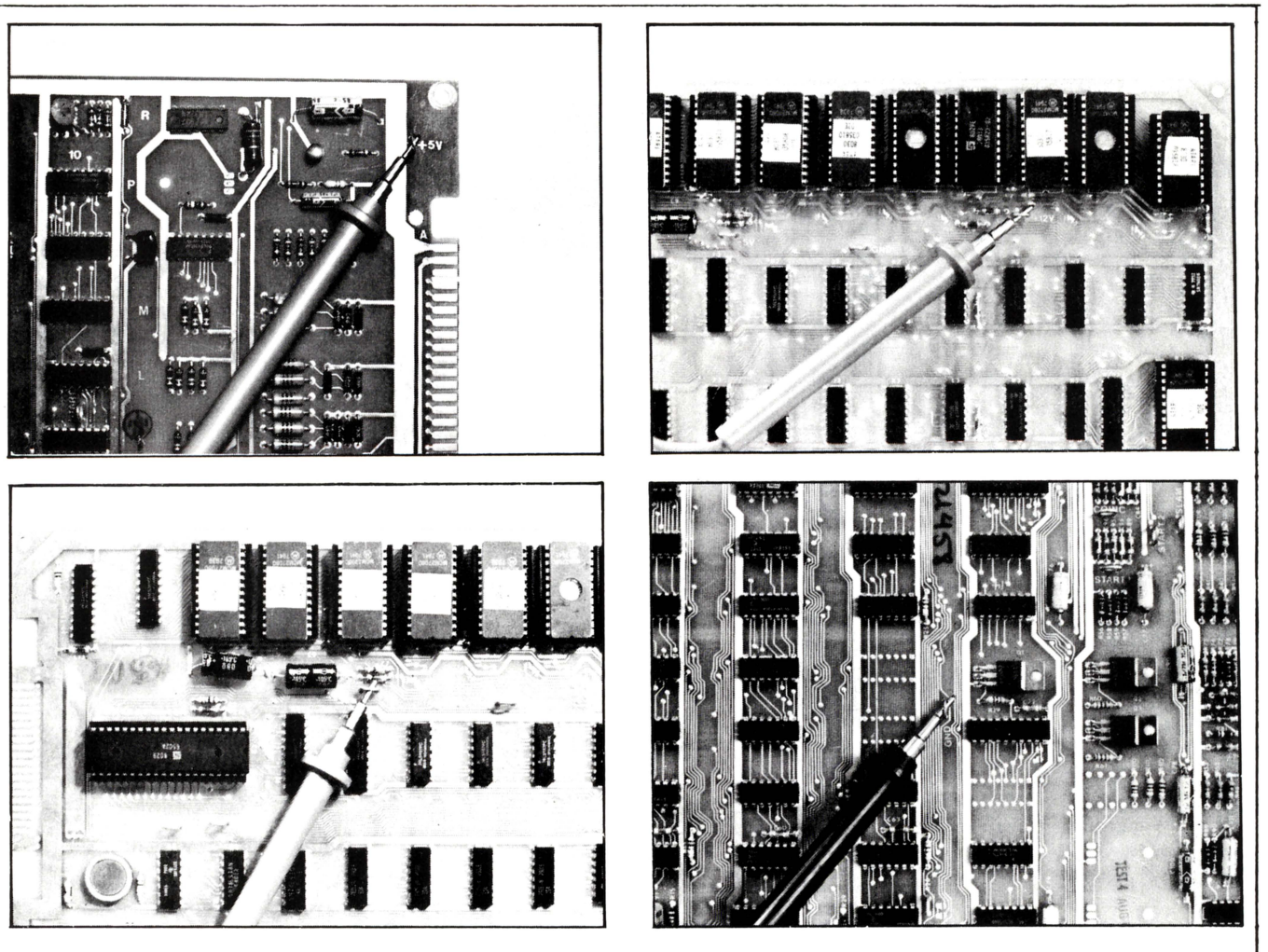
†Most DC voltage tests are used to determine the condition of the various power supplies in a game. All of the computer systems used in electronic pinball machines and video games required +5 volts DC to operate. This +5 volt power must be fairly exact and cannot vary more than 1/4 volt above or below 5 volts. If the voltage exceeds 5.25 volts or drops below 4.75 volts, the computer will probably malfunction.

As with the ground test point, some manufacturers install a +5 volt test point as well. The +5 volt power supply can be tested by setting the meter to 20 VDC and connecting the red and black meter leads to the +5 volt and ground test points. Of course, the game must be turned on to make any voltage tests.

If the +5 volt and ground test points are not available, the +5 volt power supply can be tested by placing the meter leads across the "power rails" that carry the +5 volts and ground to each of the integrated circuits on the computer board. Just connect the red lead to one side and the black lead to the rail on the other side of one of the rows of ICs.

Lead placement is not too important as the meter will simply display a negative voltage if the lead are reversed. It is the voltage measurement that is important in this test. Readings above 5.25 volts or below 4.75 volts indicate a problem with the supply.

There are other power supplies in a game as well. Many games contain a +12 volt and a -5 volt poser supply in addition to the +5 volt supply. All DC voltages are measured the same way. The black meter lead is grounded and the red lead is used to



Test points make voltage measurements easy! Here we see ground +5 volts, +12 volts, and -5 volts test points. When making DC voltage tests, the black meter lead is always connected to the ground test point.

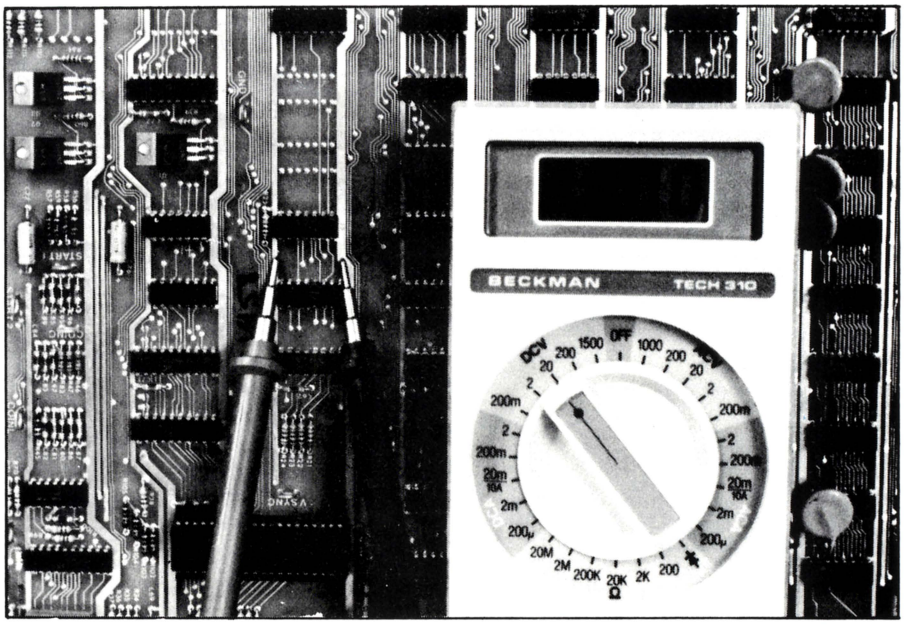
probe the test points. A negative voltage measurement will be indicated by a minus sign to the left of the meter's display.

AC voltage tests

Because alternating current is constantly reversing polarity as it moves through a wire or circuit, the red and black meter leads can be interchanged without affecting the meter display. There is no positive or negative as far as AC voltage measurements are concerned.

The meter can be used to measure the voltage of the 117 volts AC by setting the meter to 200 VAC. If the power outlet is to be tested, simply insert the two meter leads into each of the two slots in the receptacle (take care not to short the leads together!), and read the voltage as displayed on the meter.

The ground connection of the AC outlet (the half-round hole) can be tested by inserting one meter lead in the ground hole of the socket and the other lead into the "hot" side of the socket. The hot connection of the AC receptacle is the slot that is the shorter of the two.



Measure the +5 volt power supply across the power rails of the computer board.

If the ground is good, the meter will display the same reading as when the leads are inserted into the two slots. If the ground connection is bad, the reading will be much lower. Typically, a bad ground will read 40 to 60 volts. Defective ground conditions should be repaired as soon as possible to prevent possible malfunctions, shock hazard, or premature failure of the computer system in the game.

In addition to the 117 volts that power the game, there are other AC voltages as

THE BETTER
THEY GET,
THE QUICKER
THE GAME

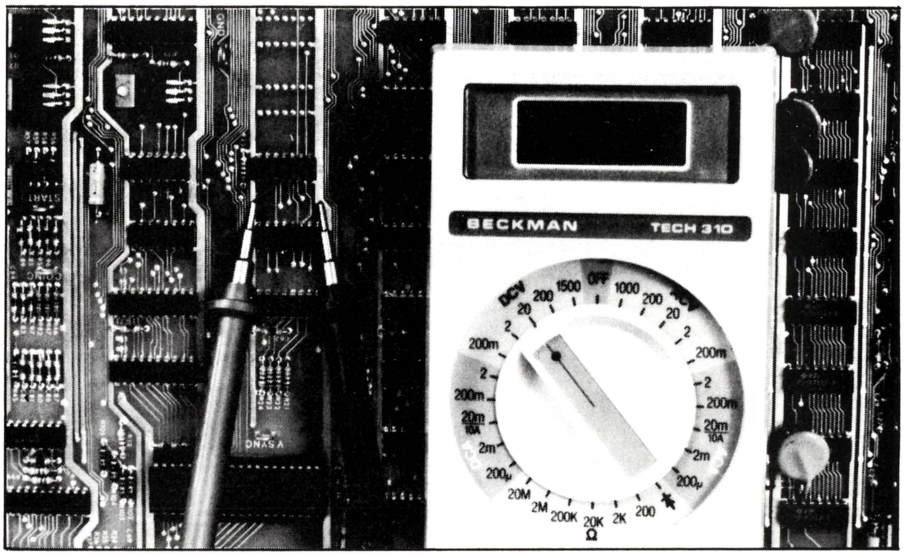
well. Inside the game a "transformer" is used to change the 117 volts into other voltages for the various circuits. Although the 117 volts is sometimes raised to a higher voltage, the transformer is generally used to lower the voltage. Common transformer outputs are 6.3 volts, 12 volts, and 20 volts. There are, of course, many others as well. Regardless of the transformer's output voltage, it will always be alternating current. The transformer uses AC as an input and produces AC as the output.

The output voltage will be marked on the schematic diagram. Some transformers (notably those found in Midway games) will have the output voltage printed right on the device itself. To measure the output voltage of a transformer, set the meter to ACV. The range setting is determined by the output voltage for the transformer. If the output is less than 20 volts, the 20 VAC setting is used. For transformer outputs of greater than 20 volts, the selector must be set to an appropriately higher range.

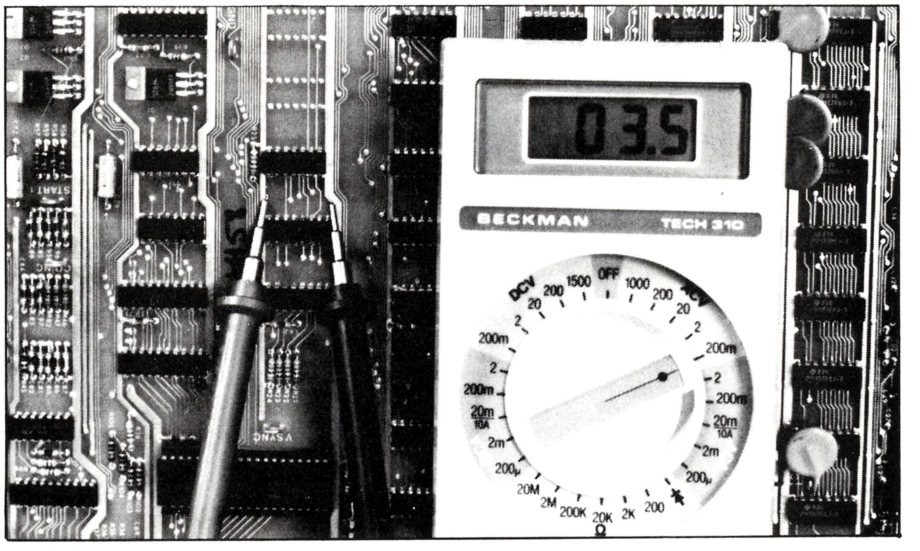
Some transformer outputs have two terminals; some have three. A transformer output with two terminals can be measured by placing either meter lead on each of the two terminals and reading the voltage displayed by the meter. The game must be turned on for any voltage test.

It's important to note that neither of the two meter leads are connected to ground for this test. Transformer outputs are not always referenced to ground. A quick glance at the schematic diagram will indicate whether or not the transformer's output is grounded. Attempting to measure an ungrounded transformer output with one meter lead connected to ground will cause erroneous readings that might mistakenly point to the transformer as being defective.

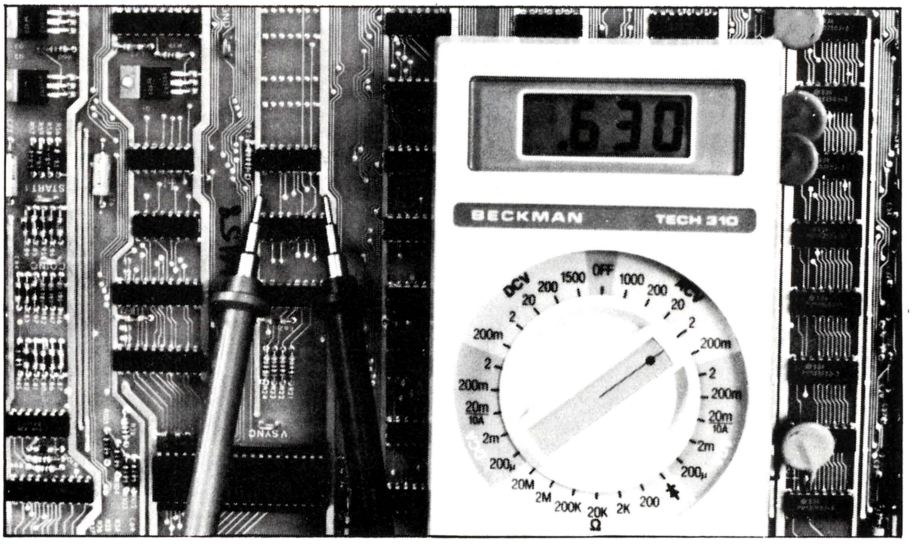
A transformer output with three terminals will generally have one of the three grounded. This type of transformer is called a "center-tapped" transformer. The voltage between the center tap (usually grounded) and one terminal is the same as the voltage between the center tap and the other terminal. The output voltage of the transformer should be measured first between the two outside terminals and then between either of the two outside terminals and the center tap. The second voltage



If the supply voltage measures lower than normal, switch the meter to read AC volts.



The AC voltage should normally be very low (less than .1 percent of the DC voltage).



Excess power supply ripple is indicated by a high AC voltage reading.

measurement should be one-half of that measured between the two outside terminals.

Alternately, the transformer's output voltage can be measured by grounding one meter lead and reading the voltage at the two outside terminals. Both readings should be the same as those printed on the transformer or listed on the schematic.

Ripple test

There is a common type of power supply failure that will allow alternating current to "ride" on top of the DC output of the supply. This condition is known as power supply "ripple" and can wreak havoc to the operation of the electronic systems in a game. Ripple in a power supply can generally be attributed to a defective "filter capacitor."

Excessive ripple will cause the output voltage of a power supply to measure lower than normal when checked with the meter. It's important to determine whether or not a lower than normal voltage measurement is caused by power supply ripple. If there is no ripple in the supply, then the problem is simply a low voltage condition. But if the low voltage reading is caused by power supply ripple, the filter capacitor in the supply is probably bad.

After measuring the DC voltage and finding it to be lower than normal, switch the meter to read AC volts. If there is no ripple in the power supply, the meter will read 0 volts AC. If, however, the low DC reading is being caused by ripple in the supply, the meter will indicate that some voltage is present when switched to read AC volts. When you switch to read AC volts, the meter will ignore the DC of the power supply and indicate any ripple as AC.

Some small amounts of AC are present in a properly functioning power supply. In a regulated powered supply, the ripple content should be less than 1/10th of 1 percent of the DC voltage. For example, a 5 volt power supply should have less than 5 millivolts of AC ripple when it's working properly. If the AC voltage exceeds 5 thousandths of a volt, suspect a defective power supply filter capacitor.

Performing the ripple test on some good, working power supplies is a good idea. This will establish some normal readings for ripple. Spotting excessive ripple is easier when the normal readings are familiar.

Audio test

The sounds produced by a game are actually changing voltages connected to a speaker. Higher voltages produce louder sounds. The audio voltages that are the input and output of the amplifier in a game can be measured with the meter set to AC volts. The setting will vary from game to game, but generally the input to the amplifier can be checked with the meter set to the 200mV range and the output to the speaker on the 20 VAC range.

If the sound system in a game isn't working, the input and output of the amplifier can be tested with the meter. If the audio input and the amplifier's power supply are both good but there is no output, the amplifier itself has failed and should be replaced. Of course, the game must be turned on and playing in order to test the sound system.

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Video test

The computer produces three signals that are used to create the images in a video game. These are known as the "video" signals, and there is one for each of the three primary colors. One of the video signals creates the red objects, one creates the green objects, and the third creates blue. These video signals are simply changing voltages. The higher the voltage, the brighter the color.

If one of the colors is missing from the display, the video signal from the computer that feeds the input of the monitor can be tested by measuring the voltage of the video.Use the 2 VAC setting. Ground the black meter lead to the chassis of the monitor, and measure the voltage by inserting the red lead into the video connector of the monitor. If there is no voltage, either the computer is not producing the video signal (not likely, by the way), or the connection between the computer and the monitor is broken.

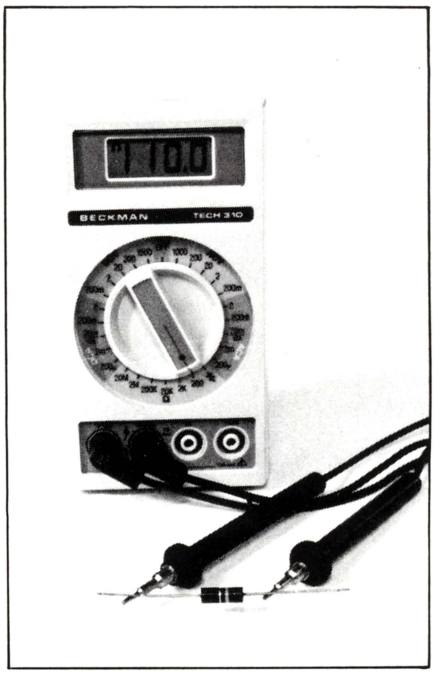
On the other hand, if the video voltage is present at the video input connector of the monitor, the missing color must be caused by a problem in the monitor.

XYZ test

In a XY video game system, the computer produces one signal that controls the horizontal movement of the electron "beam" that draws the picture on the front of the picture tube and another signal that controls the vertical movement. These two signals are known as "X" and "Y" respectively.

If either or both of these signals is missing, the monitor display will be blank. To determine if the blank display is caused by a monitor problem or a computer fault, the X and Y inputs to the monitor can be measured with the meter.

Set the meter to 20 VAC, and ground the black meter lead to the chassis of the monitor. With the game turned on, insert the red lead first into the X input and then the Y input pin of the monitor connector. The reading will vary depending on what is being displayed at the time. Two to 4 volts is about average, and the reading will fluctuate as the display changes. If the game display is stationary (as in the self-test mode or when the "high score" table is being displayed), the X and Y input voltage will not fluctuate.



Resistors are tested with the power off and the meter set to measure resistance. Here the meter indicates that the resistor being tested is 110 ohms.

If the X and Y inputs to the monitor are good, the problem lies in the monitor itself. If either or both of the inputs are missing, the problem is in the computer or the connection between the computer and the monitor.

The "Z" signal controls the electron gun, turning the beam on and off as it creates the display on the monitor. The Z input to the monitor will generally measure somewhere around 1 volt AC.

Resistance tests

Resistance is defined as the opposition to the flow of electric current in a circuit. The resistance settings of the meter are indicated by the omega symbol. The Greek letter omega is used to denote resistance because the unit of resistance measurement is the ohm. All resistance tests are performed with the power to the game turned off.

The resistance function of the meter is used to test a number of different types of components. Among them are, of course, resistors. The resistors used in games may

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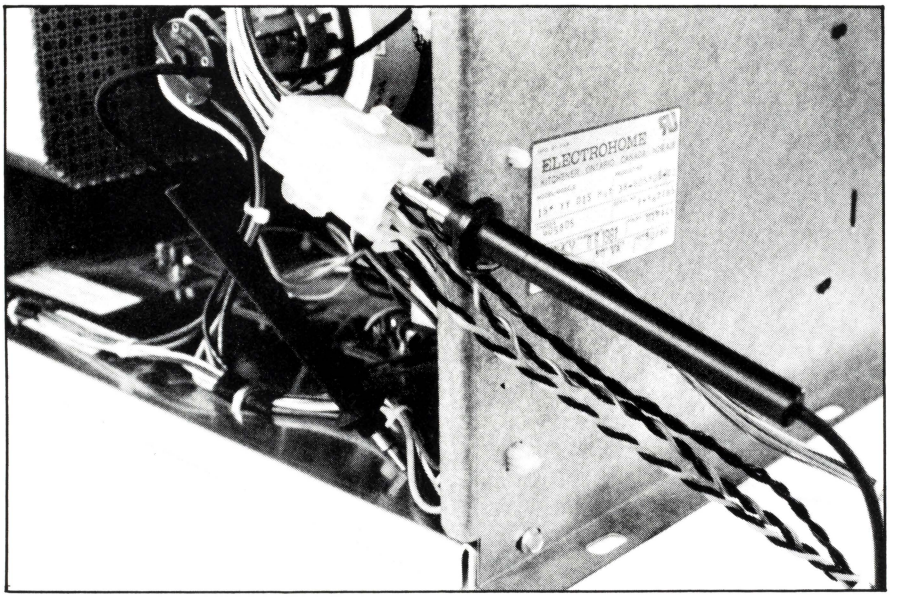

Testing the XYZ inputs to an XY monitor.

have as little as .1 ohm or as much as 10 million ohms of resistance or even more. Measuring resistance is a simple matter of setting the meter to the proper resistance range and placing each of the two meter leads across the two leads of the resistance tests. Lead placement (red or black) is arbitrary for all resistance tests. The value of the resistor is read directly from the meter's display.

The proper range setting of the meter is determined by the value of the resistor. The lowest resistance range of the meter is marked 200. With the meter set to 200, resistances from an little as .1 ohm up to 200 ohms can be measured. If the measured resistance is greater than 200 ohms, the display will indicate "OL." As with the voltage tests, OL indicates the setting of the meter is too low, and the selector must be moved to a higher range to measure the resistance under test.

The next range above 200 is marked 2K. The K stands for the metric prefix "kilo" meaning thousand. Thus the 2K setting allows resistances up to 2,000 ohms to be measured. Again, the meter should be set as low as possible without being set so low that the display indicates OL.

Bear in mind that when the selector is set to any range that has a K following the number, the measurement displayed by the meter is actually in thousands. For example, a resistor that causes 1.50 to be displayed when the meter is set to the 2K range is a 1,500 ohm resistor. For measuring resistance of 2,000 ohms or more, the meter has 20K and 200K ranges as well.

Resistance of 200,000 ohms or more requires setting the meter to the 2M or 20M range. The M stands for the metric prefix

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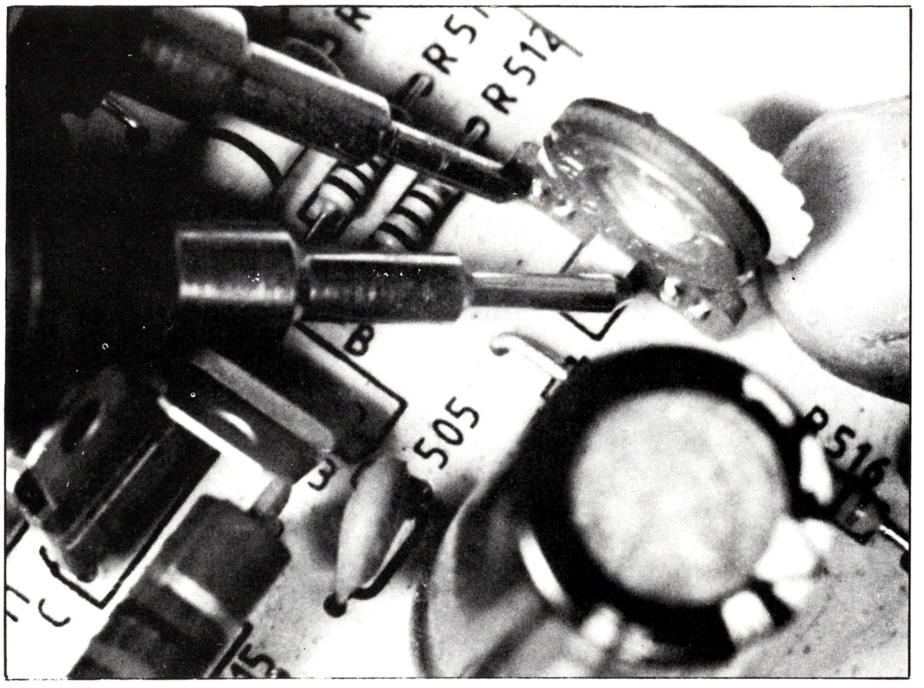
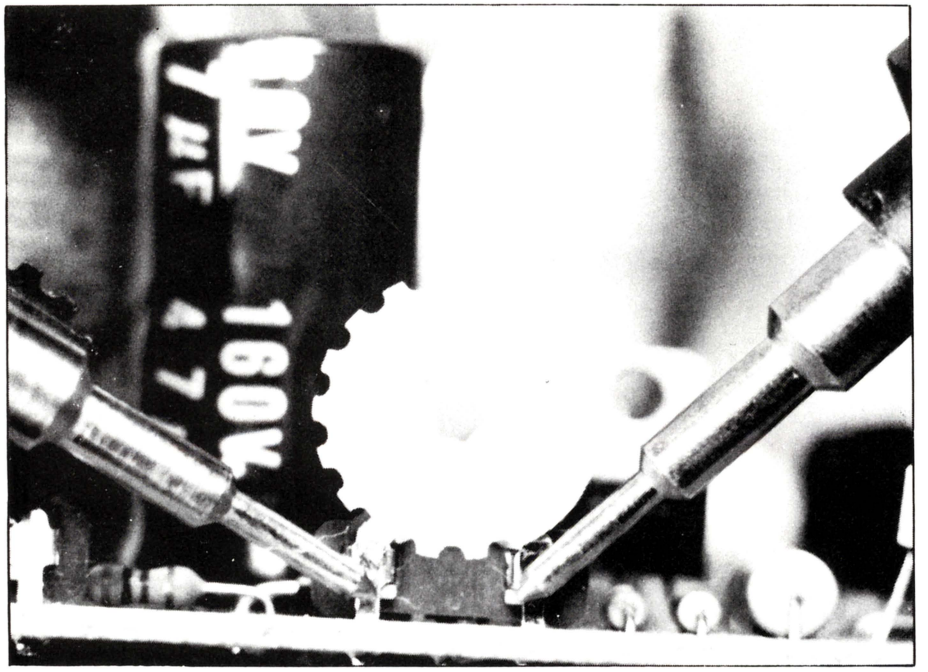


Checking a potentiometer.



''mega'' meaning million. The 2M range allows up to 2 million ohms of resistance to be measured and the 20M range up to 20 million.

The value of a resistor is printed on the component or is indicated by colored bands that circumscribe it. These colored bands are interpreted by the ''color code.'' Each color represents a number from zero to nine. If the measured resistance is fairly close to what it's supposed to be, the resistor is good.

Resistors do have some tolerance as far as their resistance is concerned and may be off by up to 20 percent above or below the resistance indicated on the part itself. When resistors fail however, they will exhibit a much higher resistance than normal or will open-circuit completely (become an infinite resistance) indicating OL on the meter.

There are two important points to remember regarding resistance tests. One is to keep hands and fingers from touching the probe tips of the meter leads while performing the test. This is especially true for the higher ranges (200K and above). Skin resistance will affect the measurement causing a lower reading than the actual resistance of the part under test.

Also, resistors that are in-circuit will often measure lower than their actual resistance because the other components in the circuit affect the reading. If a resistor tests lower than expected, it can be isolated from the circuit to be properly tested (unsolder and lift one lead from the circuit). But if a resistor tests much higher than expected or displays OL, it's definitely defective.

When a resistor fails, it will generally increase in resistance or open completely. The odds of finding a shorted resistor (one that has decreased markedly in resistance) are slim to none.

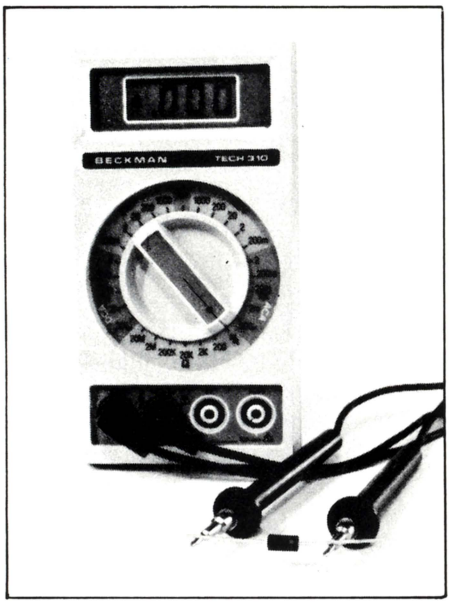
Testing potentiometers

A potentiometer is a variable resistor, one that can be adjusted to change its resistance. Commonly referred to as a ''pot,'' the potentiometer has three terminals. Start the test by measuring the resistance between the two outside terminals. The meter should display the full resistance of the pot.

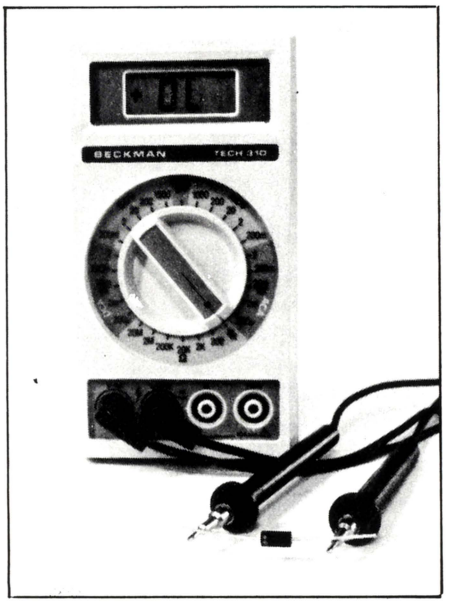
For example, a 5K pot should measure 5,000 ohms, a 25K pot will indicate 25,000 ohms, a 50 ohm pot should test at 50 ohms and so on. If the meter displays OL, the resistance element of the potentiometer is open and the pot is bad.

The second half of the potentiometer test is to measure the resistance between the center terminal (known as the ''wiper'' of the pot) and either of the two outside terminals. By rotating the potentiometer from one limit to the other (thereby moving the wiper that contacts the resistance element), the resistance reading should change from zero ohms to the full resistance of the pot.

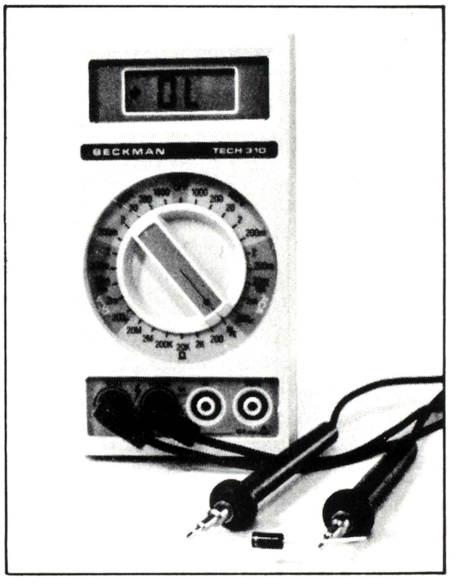
If the meter displays OL, the connection between the wiper and the resistance element is bad. Also, note changing resistance reading as the pot is adjusted. The resistance value should change smoothly from the extreme to the other. If the resistance jumps up and down, the pot is defective or the resistance element is dirty.



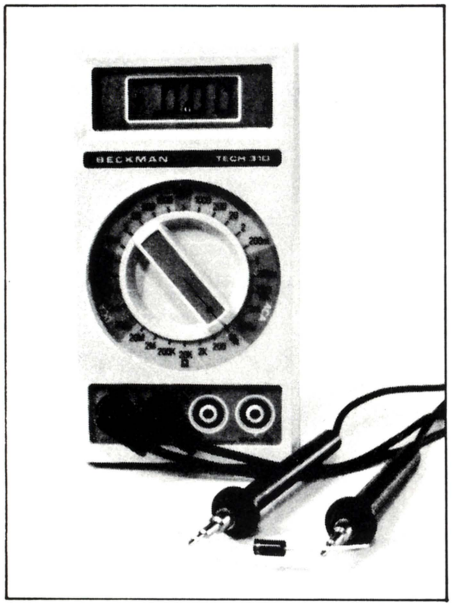
A shorted diode will test "zero" in both directions.

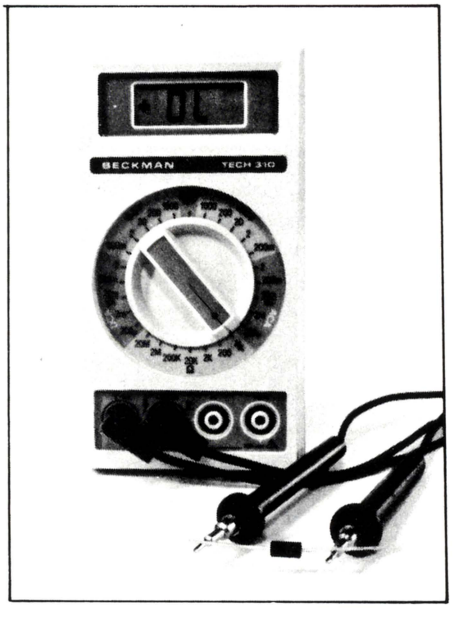


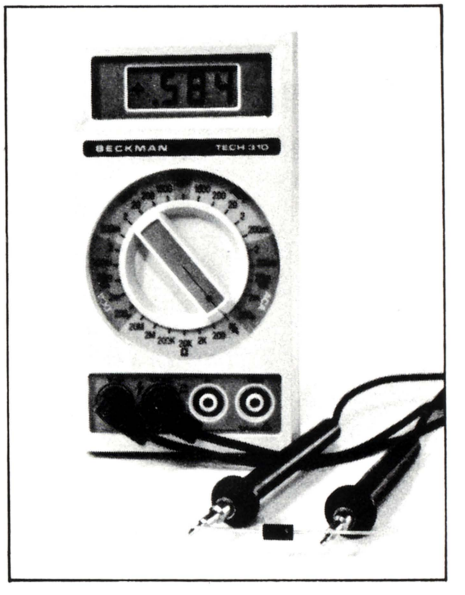
An open diode will test [OL] in both directions



A good diode will test [OL] in one direction and a "junction drop" of .5 to .9 volts when the meter connections are reversed. Use the "diode test" setting.







Although a dirty pot can often be cleaned with one of the aerosol spray cleaners, replacement of the potentiometer is recommended as the sure-fire method of repairing a circuit with a defective or dirty pot.

Speaker test

A speaker is simply a coil of wire attached to a paper cone that moves back and forth as the alternating current output of an audio amplifier passes through it. As the AC flows through the coil (known as the "voice coil"), it produces a changing magnetic field that causes the coil to be alternately attracted and repelled by the permanent magnet in the speaker.

Test the speaker by measuring the resistance of the voice coil. Most speakers will have between 4 and 16 ohms of resistance. Eight ohms is most common. Set the meter to the 200 ohm range, place the meter leads across the two terminals of the speaker, and read the resistance directly from the display. If the meter reads OL, the speaker is open (broken wire somewhere—either in the voice coil itself or one of the flexible wires that connects the terminals of the speaker to the voice coil).

If the resistance is much lower that normal, the speaker is shorted. A shorted speaker will sometimes damage the amplifier that drives it so be aware that replacing a shorted speaker may not be all that's necessary to restore the sound to a muted game.

It is possible for a speaker to pass the resistance test but produce distorted sound. The voice coil and /or speaker cone can warp causing the coil to rub against the magnet. Lightly push on the speaker cone with your fingers, using even pressure around the circumference. The cone should move easily. If the speaker cone

sticks or any grating is heard or felt as the cone moves, the voice coil is rubbing against the magnet and the speaker is bad.

Testing coils

Pinball coils and solenoids and the coils used in video games for the coin meters and coin lockouts are also tested by measuring their resistance. The resistance will vary between different types of coils. Most will have a fairly low resistance and are tested with the 200 ohm range of the meter. If the meter displays OL, the coil is open. A lower than normal resistance indicates the coil is shorted.

Transformer test

Because the windings of a transformer are generally quite low in resistance (especially the low voltage secondary windings), the meter cannot often be used to detect a shorted transformer. But an open transformer winding can be easily detected with the resistance function of the meter. If a transformer winding is open, the meter will display OL. The 200 ohm range is generally used to test transformers.

Lamp test

Lamps are generally tested by simply substituting the suspect unit with one that is known to be good. However, the 200 ohm range can also be used to test lamps. If the display read OL, the lamp is bad.

TRANSISTOR TEST

RED	BLACK	NPN	PNP
B	E	JD	OL
B	C	JD	OL
E	B	OL	JD
C	B	OL	JD
C	E	OL	OL
E	C	OL	OL

JD = junction drop voltage

Continuity tests

Testing to see if a wire is unbroken between two points is known as checking the "continuity" of the wire. Continuity tests are commonly performed to check the condition of connectors, switches, and fuses, to locate a wire within a group of wires; or to identify a ground test point for making DC voltage tests within a game. Continuity tests are performed with the meter set to the 200 ohm range.

Connectors are tested by connecting one meter lead to each side of the suspect pin. A good connection shows 1/10th or 2/10th of an ohm. If the meter displays a higher resistance or OL, the connector is bad.

Switches are tested the same way. With one lead on either terminal of the switch, the meter should display OL when the switch is open and almost no resistance at all when the switch is closed.

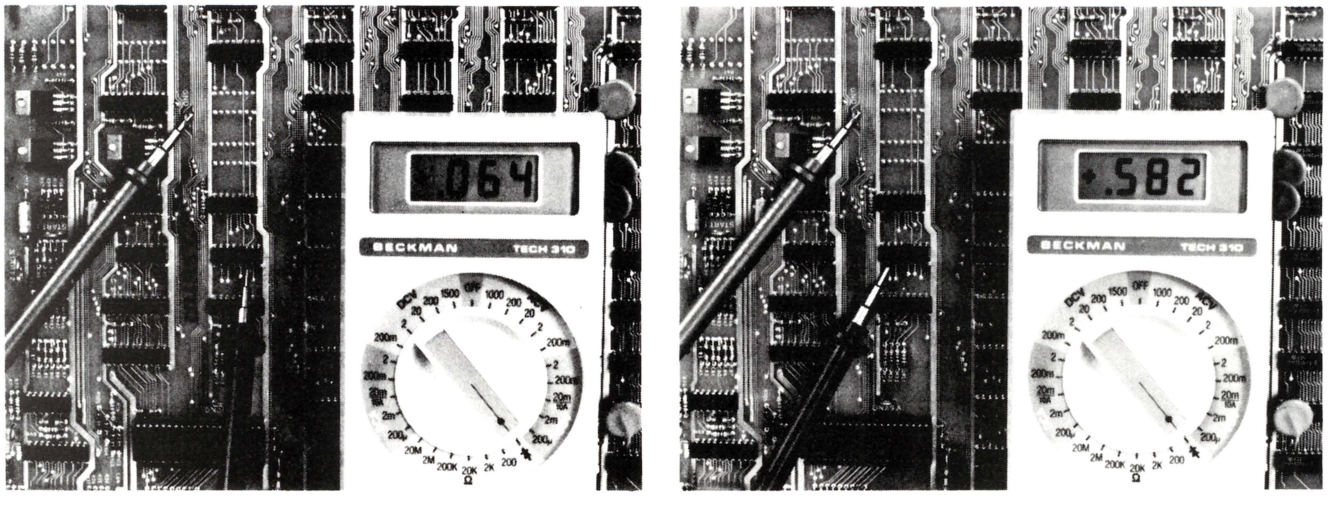
Fuses will read OL when they're blown but may show some resistance when good. Fuses with lower current ratings will have higher resistances. To be absolutely certain of the condition of a fuse, it should be removed from the circuit and tested.

Identification of a ground point within a game can also be performed with the continuity test. Unplug the game and check the continuity between the point within the game that is presumed to be a ground connection and the third pin (the ground pin) of the AC plug. Continuity indicates that the ground connection is valid.

Testing semiconductors

The digital multimeter can also be used to test many different types of semiconductors. Semiconductors are components such as diodes and transistors and are the most likely cause of an electronic failure in a game.

Many of the better quality (not necessarily higher priced) meters have a semiconductor test function built-in. Others require using the resistance function for testing semiconductors. Where included in the meter, the semiconductor test setting is indicated by a diode symbol. Digital multimeters available from Beckman, Fluke, and Soar have this



A good integrated circuit will usually show a junction drop on the inputs and outputs. An IC with a shorted input to output will show a much lower reading. Use the "diode test" setting and ground the red meter lead.

special function. Others do as well, and new brands and types of meters are being introduced all the time.

Diode test

Of all the possible component failures in a game, diode failures are by far the most common. Diodes are tested and replaced more often than any other semiconductor. Fortunately diodes are easy to test and inexpensive to replace.

A diode is like a one-way gate for current. Electric current will flow in only one direction through a diode, much like a turnstile that allows travel in only one direction through itself. The name "diode" comes from the Greek "di" meaning two and "ode" meaning lead. The two leads of the diode are known as the "anode" and "cathode."

As with the resistance tests, all semiconductor tests are performed with the power to the game turned off. With the meter's selector set to the semiconductor test function, connect the red meter lead to the anode of the diode and the black lead to the cathode. This will cause the diode under test to conduct. The meter should display a reading of between .500 and .900. This measurement is in volts.

It's known as the "junction drop" and is actually a measurement of the small amount of voltage that is lost or "dropped" across a normally working diode. The larger the device, the lower the junction drop voltage will be.

Next, reverse the meter leads and place the black lead on the anode and the red lead on the cathode. When the leads are reversed, the diode will not conduct. The meter should now display OL. If the meter displays a junction drop (.500 to .900) in one direction and OL when the leads are reversed, the diode under test is good.

The most likely failure for a diode is for it to be shorted. A shorted diode will generally test .000 or some other very low reading in both directions.

A diode can also open circuit when it fails. An open diode will test OL in both directions.

Diode tests can generally be performed while the diode is in-circuit, that is while it is still connected to the rest of the circuit. If the meter display keeps changing as the leads are held against the leads of the diode, the capacitor in the circuit is being charged by the meter. Keep the meter leads connected to the diode being tested until the display settles down. The reading will then be correct.

To test diodes with a meter that doesn't have a semiconductor test function, use one of the resistance ranges. The range will vary with the type of meter so consult the operating manual for the proper setting. A good diode will show a very low resistance in one direction and an infinite resistance when the leads are reversed.

Transistor test

A transistor is basically an electronic switch that is used to control the current flow in electronic circuits. Transistors have three elements and connections: base, collector, and emitter. Testing tran-

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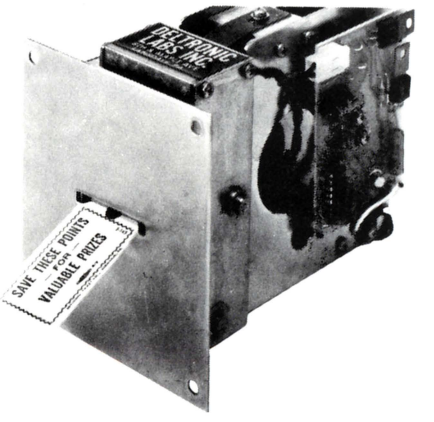

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sistors is basically the same as testing diodes, but there are additional steps because there are three connections instead of just two.

Also, there are two types of transistors. One type is known as "NPN," the other is PNP." Both are tested the same way, but some of the readings are reversed between the two types. The "transistor test chart" indicates the proper readings for a good transistor. The most likely failure is an emitter to collector short. But if the transistor fails any of the tests, it's defective.

It is not always possible to accurately test a transistor in-circuit. Other components in the circuit can affect the readings causing a transistor to seem to test bad. If a transistor tests bad in-circuit, retest it after removing it. If it still tests bad, replace it. But if it tests good after removing it, re-install it and move on to the next part.

Generally, it's a good idea to test all of the transistors in a circuit before removing any. A bad transistor will usually be easy to spot as it will often be completely shorted.

Darlington transistors will test a little different than conventional transistors because a Darlington transistor is actually two transistors in a single package. The junction drop reading between base and emitter may be somewhat higher than that of conventional transistors. Also, there is a protection diode built into the Darlington transistor that is connected between the collector and emitter. This affects the collector to emitter test, showing OL in one direction and a junction drop in the other.

Zener diode test

The Zener diodes used in games will test the same as conventional diodes. The meter will display a junction drop in one direction and OL when the leads are reversed.

Light-emitting diodes

LEDs are rarely tested when troubleshooting games. However, an LED will test as a conventional diode showing a junction drop in one direction and OL when the leads are reversed. The junction drop of an LED will be higher than that of a conventional diode. Readings of 1.2 to 1.8 volts seem to be about average.

Testing integrated circuits

Integrated circuits often fail by having one or more of the inputs or outputs short internally to ground. Much of the time integrated circuit failures can be identified by setting the meter to the semiconductor test range and using the black meter lead to probe each of the input and output pins.

For this test, the red meter lead is grounded. A good reading will show a much lower reading. As with all semiconductor tests, the power must be turned off.

* * * * *

The digital multimeter is by no means limited to the tests outlined here. Becoming familiar with the meter and its use will greatly reduce the amount of time required to troubleshoot and repair electronic games.

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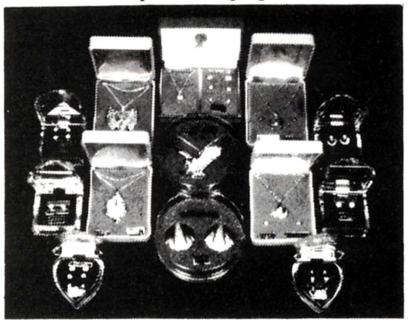

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AMOA and Coin-Op Industry Well Known in Washington

by Frank "The Crank" Seninsky

Frank Seninsky (l) explains pinball strategy to Senator Dan Quayle (R-IN) at the Congressional Pinball Tournament.

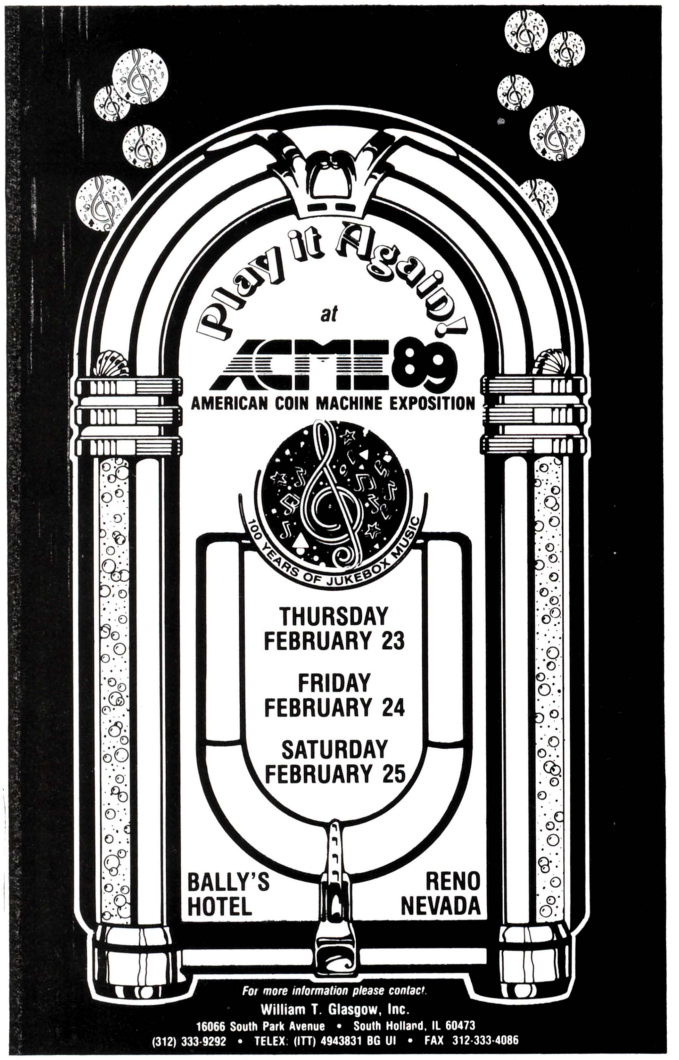
There is little doubt that this year's AMOA Government Affairs Conference firmly placed the coin-op industry in a highly respected position on Capitol Hill. The May 17 Congressional Reception at Longworth House turned out to be the best attended congressional reception that any congressman could remember. In addition to dozens of the latest coin operated videos, the first annual Democrats vs. Republicans Congressional Pinball Tournament stole the show.

Over 250 congressmen, their families and staff, representing more than 100 House and Senate offices, took turns on the 12 new pinball machines competing for $7,200 in prize money that was donated to dozens of their favorite charities. Seven hundred and forty plush elephants and donkeys were also won by the participants from three *Big Choice* cranes operated on free play. These cute little plush animals (donated by Nancy Sales and Betson Enterprises) each had a T-shirt with the tournament logo. I'm sure these were brought back to the House and Senate offices and congressmen's homes as a remembrance of the special event.

There were a total of 44 winners; 24 Republicans and 20 Democrats. First place winners each had $500 donated to a favorite charity. Top winners were: James Oberstar (D-MN) on Williams' *Cyclone*; James Quillen (R-TN) on Bally's *Blackwater 100*; Tim Penny (D-MN) on Premier's *TX-Sector*; and Chris Smith (R-NJ) on Data East's *Secret Service*.

The award for the best pinball playing congressional family easily went to Senator Dan Quayle (R-IN) who placed fourth; his son, Tucker, who placed first in the family category on *Secret Service*; and his daughter, Corinne, who took third on *Blackwater 100*.

AMOA and AAMA should be commended for working well together on this public relations event for our industry. I really want to thank each of the four pinball manufacturers for donating the pinball machines; distributor Steve Koenigsberg of State Sales for giving so much of his time and effort to deliver, set-up, and



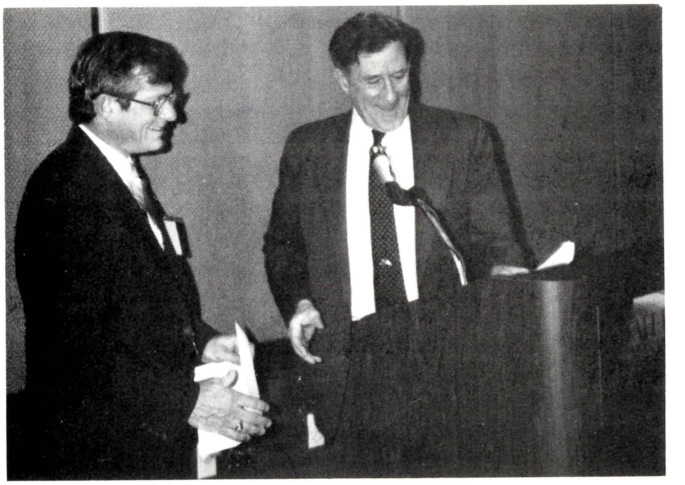
pick-up two truckloads of games (not one of the 12 pinballs malfunctioned during three hours of continuous play); and Nancy Sales and Betson for donating $3,000 worth of plush elephants and donkeys.

There were many others who helped me during the past six months: Fred Newton of the AMOA Chicago office and Steve Lipkin of Nancy Sales who helped me design the invitations; Bob Wilbur, Sandra Sealine, and the rest of the AMOA Washington, D.C. office who assisted with mailings, follow-up, and coordination work; Dick Hawkins, AMOA government affairs committee chairman; Earl Jorgenson of D&R Novelty; and the dozens of AMOA directors and their spouses who helped run and score the actual tournament. And let's not forget Bill Beckham of Red Baron, who along with AMOA director Bill LaHart kept the cranes dispensing the plush smoothly for the entire reception.

I've attended each of the three AMOA Government Affairs Conferences and am very proud that I can play a role in helping our industry improve its image as well as its bottom line. This year I had the pleasure of meeting Speaker of the House Jim Wright, Senator DeConcini, Senator Chafee, Senator Quayle, Congressmen Kastenmeier, my N.J. Congressmen Jim Saxton and Bernard Dwyer, the legislative aides for my two N.J. Senators, Bradley and Lautenberg, as well as many of the approximately 50 congressmen who attended the reception.

I also know that each AMOA director and AMOA member who attended the Government Affairs Conference had the same or possibly more impact on their legislators. It's a great feeling to know that many of these congressmen have already or soon will co-sponsor the dollar coin bill and National Jukebox Week. They all know what AMOA stands for and that AMOA members have business dealings with millions of voters.

This feeling of accomplishment can also be yours for just two days of your time. The congressmen and their legislative aides are just like you and me. They really do enjoy getting to know their constituents and about our industry and its uniqueness. I'm looking forward to next year's conference which will be even greater. I'm told that Dick Hawkins and Wally Bohrer, AMOA president, will co-chair the AMOA government affairs committee for the next three years. That's some commitment to our in-



Government relations chairman Dick Hawkins (l) and Senator John Chafee (R-RI) whose Chafee Bill would legalize parallel imports. Chafee is also on the Senate Banking, Housing, and Urban Affairs Committee that plays a role in the fate of the U.S. dollar coin.

dustry. Why don't you make the commitment to at least attend next year and be surprised at how much of an impact just being in Washington can make!!!

AMOA traveling seminars

The AMOA Education Committee (Randy Chilton, chairman) has completed the program for the AMOA 1988 regional seminars. Three identical two-day intensive training sessions have been planned for technicians and route sales personnel collectors.

The price of $100 per person to AMOA members is simply a great bargain. I'm planning to send at least five people if AMOA doesn't think I'm being too greedy. Where else can a routeman learn about the fine points of his job from a faculty of industry experts? The dates and locations for 1988 are: August 13-14, Atlanta Marriott Airport Hotel; October 8-9, Philadelphia Airport Marriott; and December 3-4, Los Angeles Airport Hyatt.

Make sure you register immediately as only about 100 people per session can be handled. You'll note that I've committed three weekends to this program because I really believe in its value (No, I am not getting paid for this). I'm looking forward to seeing you and your route people there. If you need more information, call or write me at Alpha-Omega Amusements and Sales, 6 Sutton Place, Edison, NJ 08817; (201) 287-4990.

AMOA president Wally Bohrer (l) with Senator Dennis DeConcini (D-AZ), of the Senate Appropriations and Judiciary Committees and a sponsor of S-1742 for the dollar coin, and Dick Hawkins.

Speaker of the House Jim Wright (D-TX) and AMOA past president Dock Ringo, remembering old times.

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TAX TIPS

Tax Reform Changes Still Cause Confusion

by Irving L. Blackman

Business meals double tax pleasure

Dear to the heart of every business taxpayer is deducting meals and entertainment expenses. But some changes made by Tax Reform are still causing a great deal of confusion.

Under the old law, 100 percent of a quiet business meal with a customer could be deducted even though no business was discussed. According to the new rules, only 80 percent of a business meal—quiet or otherwise—is deductible and then only if business is discussed before, after, or during the meal.

Here's another rule that seems to cause a great deal of trouble: Entertainment—a ball game, the opera, whatever—done for only a pure business motive is never deductible as a stand-alone activity. To become deductible (80 percent of the expense), the activity must be preceded or followed by a bona fide business discussion.

Now, let's put the two rules together and get two deductions for one meal. For example, Mark Seller takes Joe Buyer, a customer, to lunch. They talk business; then play a round of golf. The business lunch did double duty. First, the lunch is deductible; there was a bona fide business discussion. Second, the cost of the golf is deductible; it was preceded by a business discussion.

Make sure you and everyone in your company who engages in entertainment activities follows these rules to the letter. Get receipts and bills. Write the information needed to support the deduction on them as soon as possible.

Warning: Don't mess with payroll taxes

Other countries marvel over the American way of collecting taxes. Our system is basically voluntary. A prime example is how the government relies on businesses to act as unpaid tax collectors for taxes withheld from employees' paychecks.

Payroll taxes are considered trust funds in the hands of the employer, which means the employer has no right to use this money for anything other than payment to the U.S. Treasury. Nonpayment is a no-no. The law provides for a 100 percent penalty for failure to remit all or any portion of the trust funds.

The penalty is designed to clobber any offenders. And get this—not one penny paid by an offender is deductible. So, who might be an offender? Unfortunately, the law has been interpreted to apply to almost anyone who played a role in the misuse of payroll trust funds.

Consider this situation. A company has an office manager who signs checks, but the sole owner is the guy in charge. The manager prepared a check to remit the payroll taxes, but the owner held it up because some major suppliers were screaming for their money. He told the manager to pay the suppliers. This went on for months, until an IRS collection agent arrived. When the agent found there was no money to pay the back taxes, he invoked the penalty—against the office manager. "Just following the boss' orders," he protested, and added that he would have been fired if he had refused. The court sided with the manager, noting that the fear of losing his job saved him from *willfully failing to pay*, the measuring rod for determining liability. If the manager had failed to make the payments on his own, he would have been stuck with the penalty.

In another case, a husband and wife were assessed separately for unpaid payroll taxes. Both were officers and could sign checks, but they were not paid for their services. The court found that the husband was in control of the business and therefore personally liable for the unpaid taxes, the 100 percent penalty. But the wife was off the hook, since she wasn't involved enough in the business to be responsible for willfully failing to remit the payroll taxes. She only signed three checks and had neither managerial responsibility nor any role as a financial decision-maker (Kielisch vs. U.S., 86-2 USTC 9631).

Remember, the IRS has a lot of muscle when it comes to collecting payroll taxes. Anyone with a hand in failing to pay may be personally liable for the full amount. A way out: Don't risk personal liability and being forced to pay a nondeductible penalty. Instead, consider loaning the company the money needed. If it can't pay you back, at least you'll have a bad debt deduction.

Transferring a business to the kids

The typical owner/founder of a closely held business is a one-man gang. But sooner or later this entrepreneur realizes he cannot go on forever. The time has come to pass the business reins to the next generation. But how?

Now the task is tougher than ever. The new tax law killed an old friend—recapitalization. No longer can you freeze the value of your business for estate tax purposes by creating and retaining preferred stock while giving the growth common stock to the kids. But all is not lost. There are still other ways to get the job done. Here are the more important methods:

Gift: Immediately begin an annual gift-giving program of your stock to the younger generation. You can give $10,000 ($20,000 if married) to each donee (the person receiving the gift) per year. So, if you're married and have two children, you can give $40,000 (2 x $20,000) every year to your kids with no gift tax consequence. The future growth and income of these shares

are immediately removed from you estate.

Sale: You can sell all or a portion of your stock to your kids. The sale will result in a capital gain, which allows you to recover your cost tax free and to use the gain to offset any capital losses. Usually an installment sale will be your best bet, allowing you to defer the capital gain until the year in which you actually receive the money.

Redemption: When a corporation buys its own shares from a shareholder, it is called a redemption. In general, you can only get a capital gain if the corporation redeems all the shares you own. In most cases, if you are not entitled to capital gain treatment, the full amount received from the corporation is a dividend. But that's not as bad as it sounds. Since capital gains and ordinary income, like dividends, are taxed at the same rate, redeeming only part of your shares can make good tax sense. Tax rates are probably as low as they will ever get during our lifetime. Think redemption.

Combinations: Using the rules above as a guide, use more than one method. Often combining gifts with a sale or a redemption will help you meet specific family objectives.

It is important to note that there are other transfer methods available; for example, annuities and options. You must seek competent professional help before attempting any kind of transfer.

Penalty-free IRA withdrawals

Before Tax Reform, when people asked if they could take money out of an IRA before age 59-1/2 without paying a 10 percent penalty, there was but one answer: No way, no how. Sure, death or disability was and still is an exception, but that's a high price to pay.

Things are different now. It can be done, but there's only one way. You must convert your account balance to an annuity. You can get the money in a series of equal payments over either (a) your life or life expectancy, or (b) over the joint lives of you and your spouse (or other beneficiary). Payments must be made at least as often as once a year. In addition, payments cannot be discontinued before five years, nor can they be changed to another form. Any variation will cause the 10 percent penalty to be applied retroactively to all the amounts you received.

This is an opportunity to start getting a regular flow of funds without penalty or waiting to reach age 59-1/2. If the need exists, do it.●

"The IRS has a lot of muscle when it comes to collecting payroll taxes."

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NEW PRODUCTS

Robo War

Precise shot selection combines with impressive playfield colors and light shows in *Robo War*, the latest Gottlieb/Premier pinball, that draws players into a space age battle.

In the game scenario, Star Fighters have captured three Alpha Bases and now attack the Beta Base system. The Command Control Center directs players on a mission to neutralize the invading ships attacking the Beta Bases.

During game play the digitized sound sustains player appeal with clear voice commands. There's heavy emphasis on drop-target shooting with challenging long shots.

For multiball action, shoot up the Stargate Ramp that guides the ball to the vacant Docking Station. A new ball is released to the Ball Shooter, then the player is qualified to shoot for multiball and must shoot under the raised Stargate Ramp and strike the Spot Target that releases the second ball from the Docking Station.

Advanced features on *Robo War* include a larger, easy-to-read alphanumeric display, hinged display panel for easy access to components inside the lightbox, and an all plywood cabinet for increased structural integrity and lighter weight.

For more information, or distributor referral, write Premier Technology, 759 Industrial Drive, Bensenville, IL 60106; (312) 350-0400.

Altered Beast

Sega introduces a new conversion kit, *Altered Beast*, that takes the player on a fantasy adventure in which he transforms into a Special Force by accumulating Spirit Balls.

The player's journey takes him on five different adventures and a mission to destroy the Master Boss at the end of each stage to progress to the next level of challenge.

The objective is to rescue a girl held hostage in each of the adventures. Players can attack oncoming enemies by using a joystick and three push buttons. Changing into the Special Force creates a superior being with devastating power and mobility.

This change from man to beast brings a new dimension to game play. Unspeakable creatures attack on every front, making rescue of the innocent girl a constant challenge.

Features include continuous play and an in-cabinet operator control panel with volume switch, service switch, and test switch.

For more information, or distributor referral, write Sega Enterprises, Inc. USA, 2149 Paragon Drive, San Jose, CA 95131; (408) 435-0201.

Toobin'

For all those players looking for something different, Atari Games offers *Toobin'*, a video that highlights inner tube racing and white water adventure.

A dedicated upright, *Toobin'* is for one- or two-players and has a buy-in anytime add-a-coin feature. Amusing and colorful animation adds to the appeal.

Players assume the names of Jet and Biff and face a variety of perils as they travel along 45 rivers and 15 unique river environments. Among the rivers journeyed are the Colorado, Okefenokee, Yukon, Rio Grande, Black Forest, and Amazon. Players can select their own path through a variety of white water and attempt to float through point-gates while avoiding obstacles and animals, such as polar bears on the Yukon. There's more mayhem along the way as players encounter devilish demons trying to knock them out on the River Styx.

A special warp feature means advancement to more challenging play levels and warp bonus points. Included in every game for the U.S. and Canada is a contest giving players a chance to win a free *Toobin'* Too Cool T-shirt.

For more information, or distributor referral, write Atari Games Corp., 675 Sycamore Drive, Milpitas, CA 95035; (408) 434-3700.

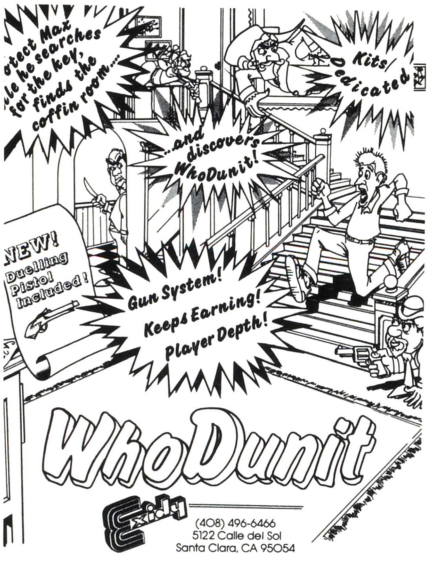
Who Dunit

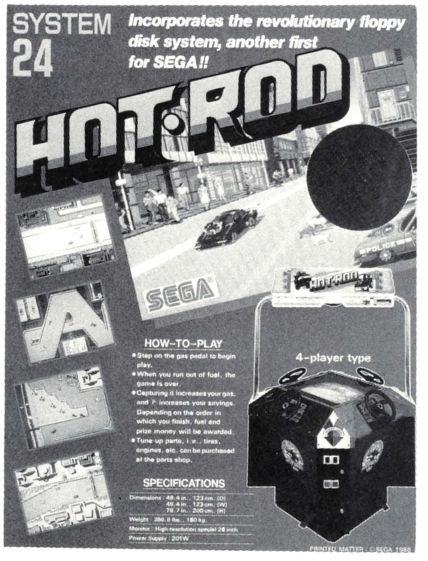
Mystery buffs will naturally be attracted to Exidy's newest video release. The company introduces another in its line of successful gun games, this time with *Who Dunit*, a mystery theme game available as dedicated or kit.

The object of *Who Dunit* is to protect the hero Maxwell while he searches for the key to an old mansion he can inherit. It's a creaky setting with lots of suspense as Maxwell finds the coffin room...and solves the mystery of Who Dunit?

The game features a replica of a dueling pistol mounted on the control panel. The kit is designed to upgrade any of the existing Exidy gun games on location. It comes complete with all necessary software and artwork needed for a quick-change of *Cheyenne, Crossbow, Combat,* and other Exidy gun games.

For more information, or distributor referral, write Exidy, Inc., 5122 Calle del Sol, Santa Clara, CA 95054; (408) 496-6466.





Hot Rod

Sega introduces *Hot Rod*, a driving game available as a four-player console unit or three-player upright with 26-inch monitor.

Hot Rod features a revolutionary floppy disk system, the System 24, that enhances total game play and graphics.

Players travel on 30 different tracks, encountering inclement weather such as rain, snowdrifts, and ice; plus other hazards like rock slides and sand. Tight corners abound with moving police cars and construction crews making for true challenges to driving skills.

Players go into the parts shop after every course to get important accessories like snow tires, spike tires, and speed tires. Depending on points and placement, players are awarded a certain amount of money to spend at the parts shop.

After each third race there is a trophy ceremony and the player with the highest amount of points gets the trophy from a pretty girl.

For more information, or distributor referral, write Sega Enterprises, Inc. USA, 2149 Paragon Drive, San Jose, CA 95131; (408) 435-0201.

Desktop Pay Phone

The Pay Phone Co. introduces the *Golden Desktop Pay Phone* that features a fireproof ABS housing and coin box and handset with retractile cord.

This model can be directly connected to a regular 48 VDC phone line with no battery or AC power required. Installation is easy with a standard modular plug.

The *Golden Desktop Pay Phone*, Model 674 ECP, has a padlocked coin box and coin refund slot. It handles seven digit local phone calls but can be modified to eight digits. Emergency 911 calls are coinless.

There are three choices of time limit on each call. Credit card calls and collect calls can be processed through the operator. Touch tone dialing is standard, but the phone can be obtained in rotary style on request.

For more information, write The Pay Phone Co., 1703 Bayberry Lane, Coshocton, OH 43812; (614) 622-9367.

Foosball 2000

Brady Distributing is currently marketing the Rene Pierre *Foosball Competition 2000* that features hard chromed outside rods and special steel inside rods.

Of particular interest is the hard varnished beech furniture finish of the cabinet, the removable gerflex base for easy cleaning, and locking device by the latch. In addition, the inside ball chute is made of steel and the legs and crossbars are packed together inside the game.

The *Foosball Competition 2000* also has light shock absorber springs and offers an adjustable number of balls for each game. Dimensions are 36.75 inches high, 61 inches long, and 39.50 inches wide; weight is 200 pounds.

For more information, write Brady Distributing Co., 4308 Wilmont Road, Charlotte, NC 28219; (704) 525-8130.

Final Lap

Atari Games presents a new dedicated driving game in the multi-station competitive racer, *Final Lap*.

In *Final Lap*, players track competing drivers in a rear view mirror displayed on the monitor. The game is a sit-down with two wheels and can be adjusted by the operator for up to six laps before the ultimate finish line.

Several of the games can be "banked together" for an impressive effect. Each unit is two games in one with two seats and two separate monitors linked together. Player controls include the steering wheel with return-to-center steering, a hi/low shifter, and accelerator and brake pedals.

One player can compete against the clock or multiple players can race simultaneously on the same course. Each player has first person perspective of the track. New players can start a game even if another race is in progress.

As an incentive for multiple player games, all players are able to continue for an extended time as long as at least one player completes the lap within the time allowed.

For more information, or distributor referral, write Atari Games Corp., 675 Sycamore Drive, Milpitas, CA 95035; (408) 434-3700.

Tournament Soccer

Penn Ray Sutra introduces a new *Tournament Soccer* with silver formica finish and black playfield. Team figures are white and gray and made of improved materials to eliminate breakage.

The entire playfield is covered in a plexiglass dome that attaches with brackets to allow the dome to slide from side to side for easy maintenance. The playfield corners and sidestrips are mitered flush for added strength and perfect bank shots. The scoring unit has easy access and is made of unbreakable plastic.

The white goal hole liner clearly identifies and protects the goal mouth area for quick scoring and fast action play. Handles are a large size for easy grip. The patented ball metering system vends nine to 11 balls. Solid rods mean less operator maintenance.

For more information, or distributor referral, write Penn Ray Sutra Corp., P.O. Box 1088, 1705 Winchester Road, Bensalem, PA 19020; (800) 523-8934 or (215) 638-4720.

Strike Zone

Sporting fun in the baseball arena comes from Leland as it debuts another sports-theme game in *Strike Zone*, a one-or two-player video available as dedicated upright, conversion kit, or sit-down table model.

In *Strike Zone* players face a realistic nine inning game. They choose a favorite city and team colors and start playing, using the familiar moves such as pitch, swing, hit, run, bunt, catch, and steal.

Timing is right for this baseball-theme entry as national competition heats up in preparation for the World Series this fall.

Leland's stat storage feature keeps all the data and awards players with a salary for their efforts. The higher the quality of play, the larger the salary awarded. There's also a home run derby in which players step up to the plate and try to send one over the fence.

The sit-down table model measures 47 inches high, 31 inches wide, and 33 inches deep. The upright is 72 inches high, 25 inches wide, and 32 inches deep.

For more information, or distributor referral, write The Leland Corp., 1841 Friendship Drive, El Cajon, CA 92020; (619) 562-7000.

City CD Combi

NSM-Lions debuts a 45/CD combination jukebox, the *City CD Combi* that offers 10 CD selections and 160 45's. The CD selections are displayed separately from the 45's with a panel at the top of the unit.

The same technology offered in the company's *City IV* 160 selection jukebox is included in the new compact disc model. CD's are stocked in a closed cassette system for complete protection and simple exchange.

Other features include a Sony CD player, eight-digit numerical display with functional lit-up areas; 12-key keyboard for title selection, hit display, and C-button for correction; electronic coin mechanism; and electronic overload protector for amplifier output.

There's a 2x200 watt amplifier with connections to auxiliary speakers, microphone, and tape recorder. Of particular interest to operators is the display of record popularity upwards and downwards; and the read-out of popularity, total of selected titles, and total cash.

The base loudspeaker is located in the lower part of the jukebox while the medium and high frequency speakers are in the upper part.

Additional accessories include remote control, service memory, recording device, mini-printer, output transfer for external loudspeakers, auxiliary amplifier, microphone, and wall consulette.

For more information, or distributor referral, write NSM-Lions, Loewen-America, Inc., 5207 N. Rose St., Chicago, IL 60656; (312) 992-2280.

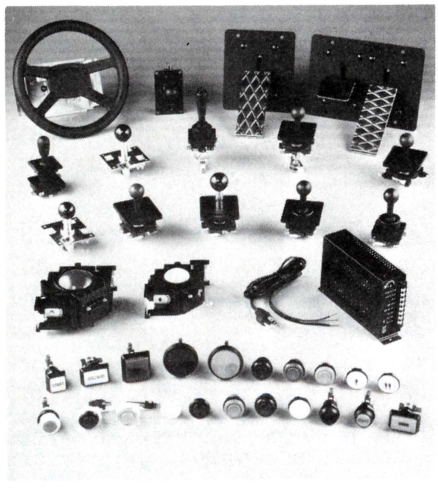
TRADE ACCESSORIES

Electronic controls

Happ Controls (formerly Controls, Inc.) announces five lines of Electronic Controls available for O.E.M.'s, distributors, and operators in the coin-op amusement industry.

This line of Electronic Controls, manufactured in the U.S.A., includes trackball controls of the rugged optical type with large and small diameter ball. The company's power controls with switching power supply and power supply cords are reliable and provide short circuit protection with a host of standard features.

The Pushbutton Controls come illuminated or available in solid colors with custom printed legends. These have a number of standard features and a host of available options including choice of colors, shapes, sizes, and controls. The Driving Controls come in a variety of types including steering wheel control, single pedal and dual pedal controls, and speed shift controls.

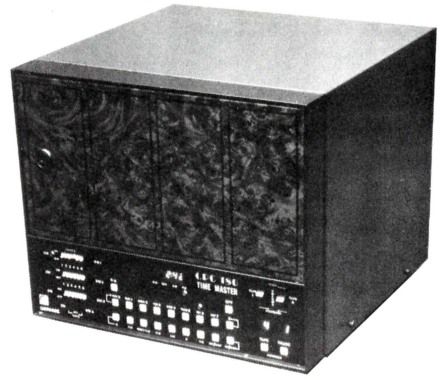


The Joystick Controls include spring action joysticks, fire button joysticks, and metal joysticks. Each includes a choice of standard features, individualized parts lists, plus information for mounting, etc.

For more information, write Happ Controls, 1251 Pagni Drive Elk Grove, IL 60007; (312) 593-6130.

Customusic systems

Rowe International's Customusic systems for foreground and background music can now be programmed for a non-repetitive music mix tailored to a location's individual needs.



Customusic systems are currently in use in hotels, restaurants, shopping centers, retail stores, office buildings, and other public areas.

Programs for foreground music include original artists performing songs in categories such as easy listening, adult contemporary, memory lane, classical, hit review, stage and screen, jazz, country, big band, and urban. Programs come on six, four-hour cartridges.

Rowe's music library currently features nearly 150 cartridges, with refresher tapes offered each month.

Customusic systems also provide two types of background music: relaxing and lively instrumentals, available on six, eight-hour cartridges with refresher cartridges issued every four months.

For more information, or distributor referral, write Customusic, Rowe International, Inc., 75 Troy Hills Road, Whippany, NJ 07981; (201) 887-0400.

Star*Tech manuals

Star*Tech Journal offers Inside Power Supplies, a manual filled with information on power supplies. Every type of power supply is covered, including linear and switch mode.

Power supply components, transformer and filter arrangements, high current supplies, and troubleshooting are also presented. The manual is written by James Beck of BAM Engineering and edited by James Calore ($24.95 U.S.).

Another service manual available is Troubleshooting Electrohome and Wells Gardner Monitors, that covers the servicing of the most popular color video monitors used in the coin-op industry ($19.95 U.S.).

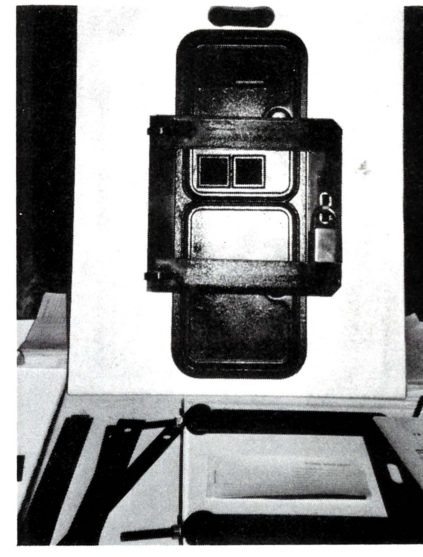
Star*Tech also offers the manual, Electronic Game Repair, that covers basic electronics, semiconductors, video game systems, electronic pinball schematic reading, and more ($24.95 U.S.).

The shipping cost on all manuals is $2.50 each; $9.00 for Air. Order manuals (prepaid or C.O.D.) direct from Star*Tech Journal at P. O. Box 1065, Merchantville, NJ 08109; (609) 662-1080.

Security devices

T & T Resources and Development introduces Defender-I, Defender-II, and Defender-III video and coin-operated game security bar and anti-theft devices to help cut down on video and coin-operated machine break-ins that have been escalating at an alarming rate.

These anti-theft security bars are the first in a line of video and coin- operated machine protection devices which address and solve machine coin door theft and damage problems as complete as currently available to the street and arcade operator today.



Defender-I, Defender-II, and Defender-III protect all of the vulnerable areas of the entire coin door(s) housing which include locks, hinges, and rejected coin exit chutes; and at the same time, not leave the security bars themselves subject to bolt cutters, sawing, reverse bolt back-off, etc.

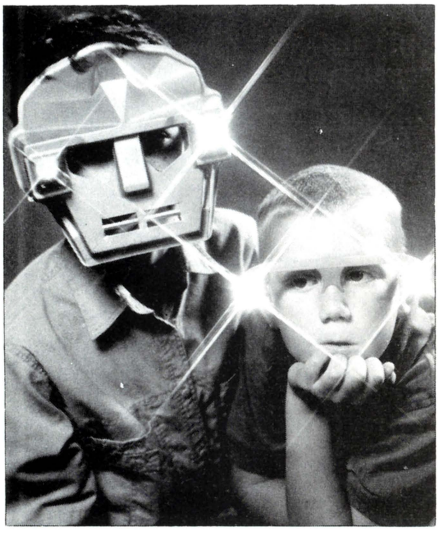
Unlike many security bar devices, these are constructed of the highest quality steel and packaged with goof-proof templets to assure each user of the security bars an accurate, secure installation with a minimum

of fuss and time consuming hassle. These security bars are easily able to be installed on more than 95 percent of all existing video and amusement machine coin doors including the narrow width and off-set door models.

For more information, write T & T Resources and Development, P. O. Box 91257, Los Angeles, CA 90009; (213) 207-9522.

Laser beam toy

Pentron Products introduces Star Lazers, a new, laser-light toy that combines creative fun and nighttime safety play with a cause-related marketing effort to benefit kids.



Star Lazers lights the way to day or night play for kids four years old and above. With two beams of light that shoot out from plastic headgear, Star Lazers spark imaginative play. The toy comes battery-packed and ready to shine. Kids can also attach their Star Lazers to customized, character masks available from Pentron. The many options available with Star Lazers makes it an ideal seasonal or promotional tie-in toy.

A percentage of sales from the Star Lazers premium, promotions, and merchandising markets has been committed to benefiting youth organizations. For every pair of Star Lazers that is sold within these markets, a nickel will be donated to Corporations For Kids, Inc. (KIDSCORPS).

KIDSCORPS, founded by Oakland A's pitcher Dave Stewart, pairs U.S. companies with youth service groups to coordinate and promote fund-raising efforts that benefit kids.

For more information, write Dan Stevens, Specialty Sales Group, Neale-May & Partners, 4920 El Camino Real, Los Altos, CA 94022; (415) 967-4444.

Tax worksheet

Research Press introduces the Lotus 1-2-3 tax forecasting and planning worksheet for small business owners and their financial advisors. Called TOTALTAX, the worksheet does both corporate and personal tax computations for tax years from 1987 through 1992.

A unique second generation feature provides for a flow through of income and deductions from the business tax module to the personal tax module, providing comprehensive tax planning for small businesses and their owners. The program will handle tax calculations for (1) regular corporations, (2) personal service/professional corporations, (3) S corporations, (4) partnerships, and (5) proprietorships.

TOTALTAX is a Lotus 1-2-3 template available for $195. Service is an additional $100 per year. Updates are shipped quarterly and users receive a monthly newsletter on using computers for tax planning. The user manual includes an extensive checklist of tax planning strategies and ideas. The package is sold with a 60-day money back guarantee.

For more information, write Research Press, Inc. 4500 West 72nd Terrace, Box 8137, Prairie Village, KS 66208; (913) 362-9667.

Vending alarm

BRW Systems, designer and manufacturer of security related products, has chosen Coin Security Systems of Van Nuys, Calif. as the exclusive distributor for their new Integrated Impact Detection Alarm System (IIDAS).

IIDAS is a multiple sensing and alarm unit that detects unauthorized entry, abuse, or severe impact to any type of vending equipment.

Initially designed to prevent coin theft and handset abuse to public coin telephones, IIDAS can be successfully applied to almost any coin- operated vending machine from money changers to can vending machines.

IIDAS features an audible alarm with an automatic reset and multiple sensing triggers that monitor various inputs such as coin box, electronics compartment, as well as machine or enclosure removal.

IIDAS operates off traditional vending power sources or independently off a DC battery and is small enough, 1.8-inch by 2-inches, to be concealed within any coin-operated vending machine.

For more information, write David Gold, Vice President of Sales, Coin Security Systems, 7119 Gerald Ave., Van Nuys, CA 91406; (818) 782-5454.

Jet Sort 3000

Cummins-Allison Corp. offers the Jet Sort 3000 high speed coin sorter/counter that is five times faster than conventional units.

The Jet Sort 3000 handles 3,000 mixed coins per minute. Verifying speeds are a high as 3,000 coins per minute.

Several six-bag models are available that handle all U.S. coins except the "Ike" $1. All Jet Sort 3000 models use the same one-moving-part sorting design.

Cummins-Allison also has a six box (drawer) model to collect sorted coins. Box style units sit on counters and tables, using little space. Bag units include stands and casters.

For more information, write Cummins-Allison Corp., 11909 W. Dearborn Ave., Milwaukee, WI 53226; (414) 774-4540.

Bonding compound

Master Bond offers a new, extremely low-viscosity flexible UV curable casting and bonding compound called UV10FL. A single component system that requires no mixing, it provides exceptionally fast cure times at ambient temperatures upon exposure to a UV light source.

Casting of up to 1/4-inch in thickness can be cured with UV10FL. High bond strengths are obtained with glass, metals, ceramics, many plastics, elastomers, and paper. Long-term durability of bonds is excellent even when exposed to adverse environmental conditions including heat and moisture.

For more information, write Master Bond, Inc., 154 Hobart St. Hackensack, NJ 07601; (201) 343-8983.

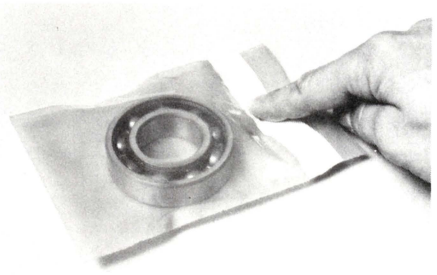
Self-seal bag

Cortec Corp. introduces a self-seal poly bag that protects metal parts from dirt, dust, and rust. The self-seal lets the user open and close the bag easily, even faster than a ziplock-type seal.

A user can protect bearings and other parts from humidity, moisture, dust, dirt, and rust for up to two years by using a four-by-six inch bag costing only seven cents. The bearing needs no special oiling or treatment to prevent rust since the poly bag has been extruded with Cortec VCI (Vapor Corrosion Inhibitor).

After placing a part in the self-seal poly bag, the VCI vapors completely saturate the inner atmosphere of the package and penetrate to all surfaces, including small recesses and hard-to-reach cavities of the packaged part.

The VCI's vapors effectively prevent any corrosive action to ferrous metals including stains, water spots, tarnish, and rust. Parts protected in the self-seal poly bag are ready for immediate use at any time; no cleaning is needed.



The self-seal bags are available in six standard sizes from three-by-five inches up to 12-by-18 inches with a standard four-mil thickness.

Anyone interested in evaluating these quick-seal bags can obtain a free sample by writing Cortec Corp., 310 Chester St., St. Paul, MN 55107; 1-800-4-CORTEC.

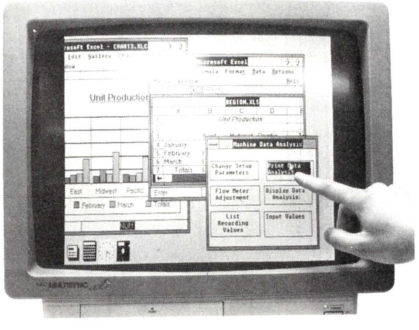
Graphic LCD module

Densitron Corp. a manufacturer of intelligent LCD modules, has introduced a 400x640 dot graphic display module with a fluorescent backlight, Model LM638. This innovative backlight overcomes a problem that has long plagued LCDs by providing a bright, reliable light source that enhances the contrast. It lasts longer than the few thousand hours currently available from other light sources.

Model LM638 is priced at approximately $500 each in 100-piece quantities. For further information, write Chuck Britten, Densitron Corp., 2540 W. 237th St., Torrance, CA 90505; (213) 530-3530.

Touch screen

MicroTouch Systems announces the Touch WindowsDriver; a software package allowing its touch screens to be used with all Microsoft Windows applications. The driver enables all software running under Microsoft Windows to be operated with the use of the MicroTouch Screen, the company's capacitive touch screen product.



Microsoft Windows offers a graphics-oriented environment for PC-compatible computers similar to the Apple Macintosh operating environment. Applications written under Windows typically use the environment to offer overlapping windows, pull-down menus, icons, and scroll bars for easier and more intuitive use.

Current applications running under Windows include spreadsheet and word processing software from Microsoft, CAD, and desktop publishing programs, as well as numerous vertical market applications written with the help of extensive Windows development tools.

With the Touch WindowsDriver, users can for the first time use a touch screen to control these end-user applications. With touch screen input, cursor control is as natural as pointing with one's finger. Users can select from menus, create drawings, and manipulate windows simply by touching the screen without reaching, orienting, and clicking a mouse.

For more information, write Micro Touch Systems, Inc., 10 State St., Woburn, MA 01801; (617) 935-0080.

History of the coin machine

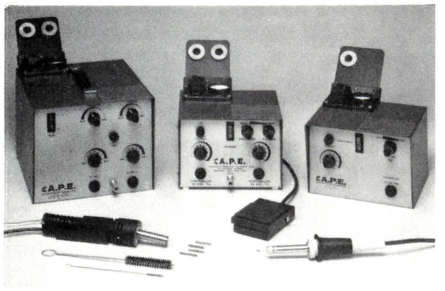
A thoroughly researched history of the development of the coin machine has been compiled by Nick Costa in the new book, Automated Pleasures, that illustrates the progress of early machines throughout the USA and Europe.

Costa has traced all the original patents to the machines, ensuring their rightful place in history. He covers the subjects of competitive games, shooting games, fortune tellers, billiards and pin bagatelle, wall machines, strength testers, and much more ($24.95 including post and packing).

To order a copy, write, Kevin Francis Publishing Ltd., Landcroft House, 85 Landcroft Rd., East Dulwich, London SE22 9JS; phone 01-693 1841 or 01-299 3951.

Solder systems

The Automated Production Equipment Corp. (APE) introduces new generation portable, self-contained bench-top solder extraction systems to ensure high reliability, repair, quality, and consistency.



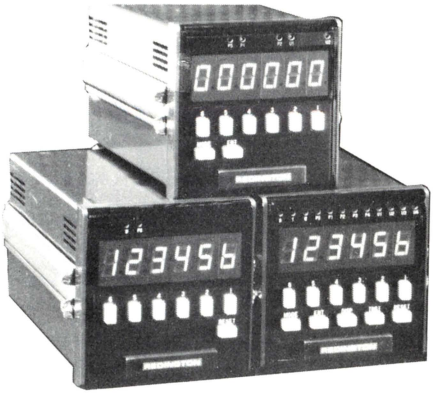
Models EX-500, EX-501, and EX-525 have these features: 1) Zero voltage switching and localized grounding for CMOS safety, 2) Finger switch/foot switch option for precise operator control, 3) Low voltage heating elements and accessories for operator safety, 4) Microprocessor controlled temperature regulation, and 5) Self-contained pumps that produce the highest vacuum force.

For more information, write, Automated Production Equipment Corp., 142 Peconic Ave., Medford, N.Y. 11763; (516) 654-1197.

LED totalizers

A high degree of flexible, easy programming with continual performance are highlighted in Redington's three new compact Series 800 Electronic Display Totalizers, Predetermining Counters, and Tachometers/Rate Meters.

Adaptable to various heavy duty industrial uses, whether one product application or a variety of needs, each series model offers production cost and time savings, and meets all industry standards.



Series 800 feature six digit solid state LED displays with programmable decimal point plus memory, writing, add/subtract, and quadrature.

Typical applications include counting and totalizing parts, cycles, strokes, etc.; preset counting of batching, packaging, and blending; speed and rate indication of flow and production rates, motor and line speed; plus more.

For more information, write Series 800, Redington Counters, Inc., P. O. Box 608, Windsor, CT 06095; (203) 688-6205.

CD loudspeakers

Frazier, a division of Sound-Craft Systems, announces the availability of CD-ready loudspeakers from its expanded facilities at Petit Jean Mountain, Morrilton, Ark.

Frazier CAT series loudspeakers offer distributors of CD jukebox systems loudspeakers fully capable of handling the power characteristic of the new CD systems. The CAT 10, CAT 35, and CAT 40 utilize the Coincident Aligned Transducer principle of design. The hi-quality components are mounted on a single axis or acoustic center line allowing for extended frequency range from a compact enclosure.

Frazier has developed a unique and inexpensive adjustable wall-mounting system for these speakers that simplifies installation in clubs, restaurants, and other amusement locations. The cost-effective mounting system together with CD-ready speaker designs offer the CD jukebox distributor a complete sound package.

For more information, write Frazier, Route 3, Box 319, Morrilton, AR 72110; (800) 643-8747.

Repair tapes

The Video Repair School offers a large selection of helpful tapes geared to game repairs.

Among the titles available are: Video Game Monitor Repairs and Adjustments, Pinball Repairs, Video Game Repair, How To Use a Volt Meter, How To Use An Oscilloscope, How To Use The Logic Probe and Pulser, and How To Solder Like a Pro.

Other selections include Basic Electronics Series, All About Resistors, and All About Capacitors. The average cost per tape is $29.95.

For more information, write Video Repair School, P. O. Box 121, Glen, MS 38846; (601) 287-1594 or (901) 645-4428.

Timely protection

Eureka Enterprises has lightened up the heavy subject of safe sex and introduced a novelty item, The Love Nut.

The Love Nut is a real hazel nut. Strike it on a hard surface and from its hollowed out interior pops a condom! The Love Nut is firmly attached to a business-size card that humorously describes the product and its timely protection.

Designed for stores, bars, lounges, and personal fun, The Love Nut is available in an eye-catching display containing fifty nuts, at $50.00 wholesale. Individual Love Nuts are $1.98 each plus $1.00 shipping and handling.

For more information, write Eureka Enterprises, 1 Edgedale Rd. N.W., Calgary, Alberta, Canada T3A 2P6; (403) 239-3441/938-7329.

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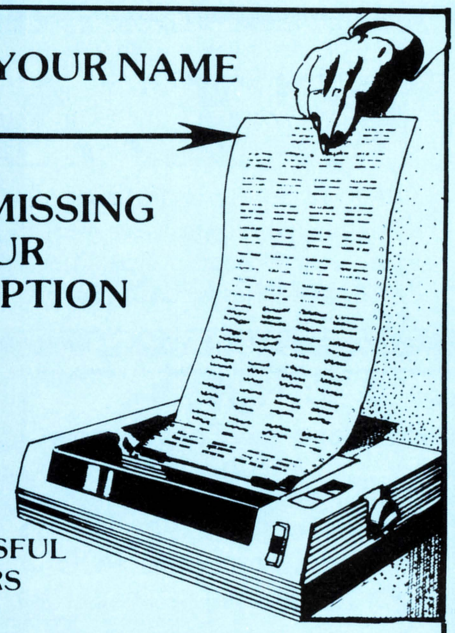

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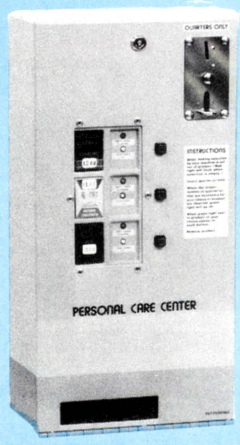

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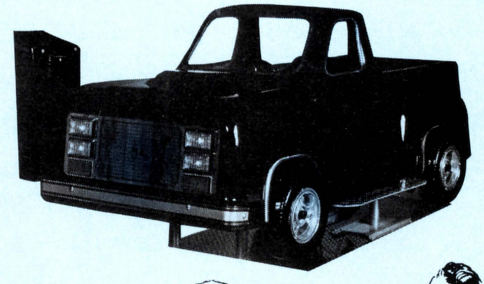

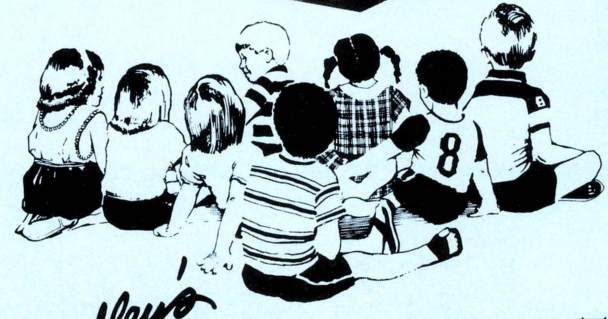

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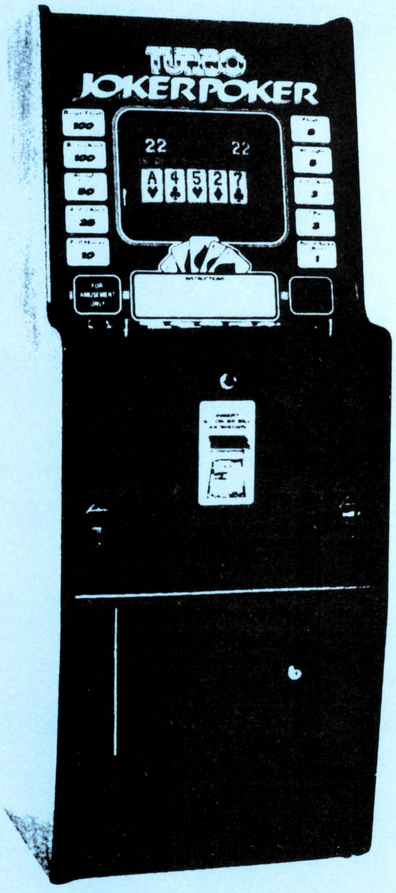

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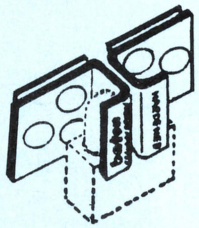

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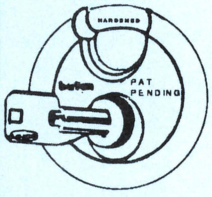

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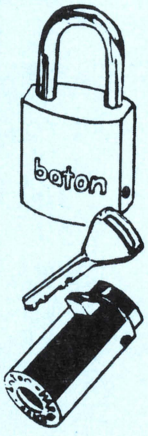

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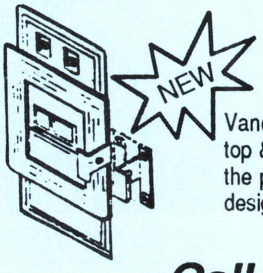

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AUGUST 12 13
Amusement and Music Operators of Virginia annual meeting and show, Ramada on 57th, Virginia Beach, VA. Contact AMOV (804) 262-9283.

AUGUST 12 13 14
Wyoming Candy, Tobacco and Coin Vendors annual meeting, Holiday Inn, Riverton, WY. Contact Tom Kilty (307) 635-6467.

AUGUST 26 27 28
Amusement and Music Operators of Tennessee annual meeting and trade show, Vanderbilt Plaza, Nashville, TN. Contact Tom Jackson (615) 242-7747.

SEPTEMBER 9 10 11
North Carolina Coin Operators Association annual convention and trade show, Charlotte Marriott Executive Park, Charlotte, NC. Contact Bobby Earp (919) 584-4833.

SEPTEMBER 21 22 23 24
Michigan Coin Machine Operators Association annual meeting and trade show, Clarion Hotel, Lansing, MI. Contact Walt Maner (517) 372-2323.

SEPTEMBER 22 23 24
Wisconsin Amusement & Music Operators 1988 Fall Conference, Concourse Hotel, Madison, WI. Contact Kari Foster, (414) 529-4704.

OCTOBER 20 21 22 23
National Automatic Merchandising Association annual convention, New Orleans, LA. Contact NAMA (312) 346-0370

NOVEMBER 3 4 5
Amusement and Music Operators Association Expo, Hyatt Regency, Chicago, IL. Contact AMOA (312) 565-4602.

FEBRUARY 23 24 25
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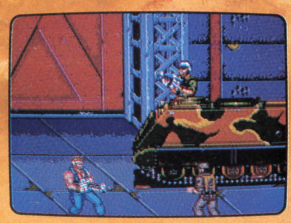

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